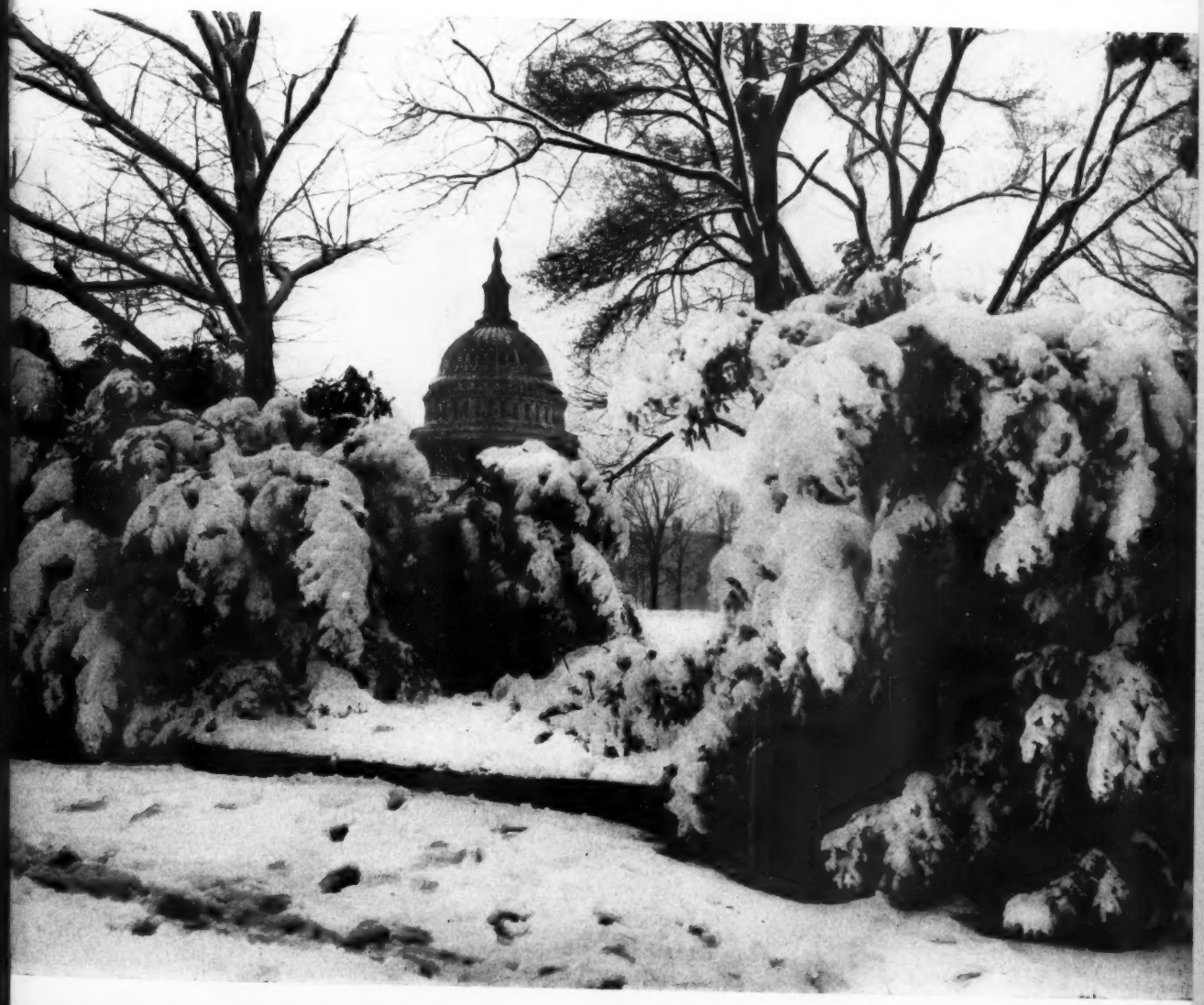
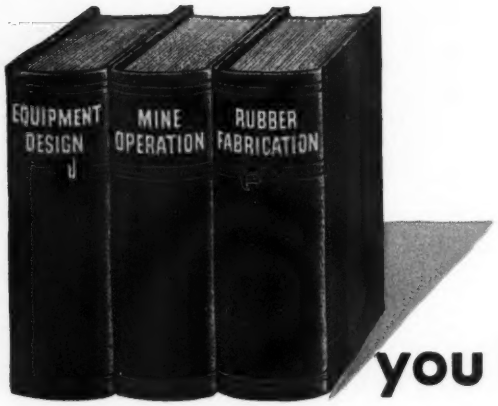
# Mining CONGRESS JOURNAL

THE AMERICAN MINING CONGRESS

JANUARY
1946



# WITH 3 WAY ENGINEERING




you bring together the specialized knowledge and experience of the MINE ENGINEER, the EQUIPMENT ENGINEER, the BELTING ENGINEER to get low cost *CONVEYOR HAULAGE*

UNITED STATES RUBBER COMPANY · TRADE MARK · US

EQUIPMENT ENGINEER
BELTING ENGINEER
MINING ENGINEER

SERVING THROUGH SCIENCE

**UNITED STATES RUBBER COMPANY**

1230 Avenue of the Americas • Rockefeller Center • New York 20, N. Y.

Mining CONGRESS JOURNAL

VOLUME 32, NUMBER 1 FOR JANUARY 1946

# Contents

JULIAN D. CONOVER
*Editorial Director*

★

*Associate Editors*

A. W. DICKINSON H. L. MOFFETT
P. D. McMURRER G. B. SOUTHWARD
B. C. WILKERSON

*Circulation*
M. D. TAYLOR
*Advertising Representatives*
FRANK W. MORAN (*Chicago*) RALPH F. DUYSTERS (*New York City*)
RALPH W. HARKER
(*Los Angeles and San Francisco*)

★ ★ ★

FRONT COVER: The Capitol in Winter

Page

EDITORIALS ..... 21

TOP CUTTERS IN MECHANIZED MINES ..... 22
By P. R. PAULICK

THE GRANDVIEW MINE ..... 26

OREGON COAL MINE STEPS UP PRODUCTION ..... 32
By RALPH S. MASON

MERCURY MEANDERINGS—Part I ..... 36
By WORTHEN BRADLEY

DEVELOPING FOR THE FUTURE ..... 40
By C. C. CONWAY and FRED A. MILLER

SPIRAL CONCENTRATOR RECOVERS TANTALUM ORES AT THE HARDING MINE ..... 44
By JOHN A. WOOD

COLOR CODING OF EXTERNAL MOTOR AND STARTER TERMINALS ..... 46
A Subcommittee Report to the Power Committee.

DEPRECIATION—Report of the Tax Committee of the American Mining Congress ..... 48

WHEELS OF GOVERNMENT ..... 53

PERSONALS ..... 57

NEWS AND VIEWS ..... 61

MANUFACTURERS FORUM ..... 74

*Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress*

Copyright 1946, by

THE AMERICAN MINING CONGRESS

309 MUNSEY BLDG., WASHINGTON 4, D. C.

HOWARD I. YOUNG, *President* · DONALD A. CALLAHAN, *Vice President* · LOUIS S. CATES, *Vice President* · JAMES D. FRANCIS, *Vice President* · JULIAN D. CONOVER, *Secretary*

Foreign, $4.00. Single copies, $0.20. February Annual Review Issue, $0.75.
Entered as Second-Class Matter, January 30, 1915, at the Post Office at Washington, D. C.

Member, Audit Bureau of Circulations

ABC

# MEET THE *NEW*

# MARION

## A BIGGER AND BETTER

THE MARION STEAM SHOVEL

# 151M

## ROCK SHOVEL!

*Here it is...*

**WITH EVERY FEATURE NECESSARY FOR HEAVY DUTY SERVICE**

**OUTSIDE DIPPER HANDLE**
**TWO-PIECE DIPPER**
**SINGLE HITCH TO DIPPER**
**AMPLIDYNE - ROTOTROL CONTROL**

***POWER - SPEED - WEIGHT***
**COMBINED TO MAKE THIS THE MACHINE OF TOMORROW**

***WHAT IS YOUR PROBLEM?***

**3/4 CU. YD. TO 40 CU. YDS.**

COMPANY • MARION, OHIO

# BATTERY-OPERATED Shuttle Cars Shorten Gathering Trips...

*Courtesy of Engineering & Mining Journal*

# ...ALKALINE BATTERIES Cut Haulage Costs

BECAUSE they carry their own power supply, battery-operated shuttle cars can take the shortest practical route between face and loading stations. No time is lost in making or breaking external power connections with battery cars, or in round-about maneuvering to avoid running over cables. Since battery shuttle cars do the job the quickest, shortest way, they can make more hauls per shift at lower operating cost.

With batteries exchanged at the end of each shift, a shuttle car is kept *continuously* supplied with adequate power. While one battery operates the car the other is charged. Not only does the car make efficient use of power but current for charging is the lowest-cost power available. As charging can usually be done on off-peak hours, a substantial reduction in maximum power demand is effected.

Altogether the superior flexibility, higher availability, and over-all operating and maintenance economy of the battery-operated shuttle car make it an inherently dependable and efficient haulage unit—especially when powered by Edison Alkaline Batteries. With steel cell construction, an alkaline electrolyte that is a preservative of steel, and a foolproof principle of operation, Edison Batteries are the most durable, the longest-lived and most trouble-free of all batteries offered for haulage services. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.

Edison
ALKALINE BATTERIES

# Here's the "inside" story of SAFER FIRING

**EXCLUSIVE FEATURES MAKE DU PONT ELECTRIC BLASTING CAPS SAFER.** Two important improvements—nylon-insulated wires and rubber plug closures—give added measures of safety to Du Pont Instantaneous and Delay Electric Blasting Caps. These features help reduce to the minimum the risk of misfires.

The cross-section picture below shows why Du Pont Electric Blasting Caps are safer.

Nylon insulation is supplied in brilliant colors ... minimizes the possibility of error in hooking up.
Nylon-insulated wires are tough ... resist abrasion ... are equal to enamel in preventing current leakage.
Nylon-plastic insulation can readily be removed when making connections.
Nylon-plastic insulation is unaffected by sudden changes in temperature. The wires are clean and easy to handle.
Rubber plug closures provide maximum water resistance. Plug is unaffected by extremes of temperature.
Rubber plug closures are double-crimped in the shell to assure a leak-proof cap.
Shorter plug permits using cap shells from ½" to 1⅝" shorter when compared with old types. This makes priming easier, quicker, safer.
Although the shell is shorter, explosive strength is the same as old-type caps.

These exclusive features of Du Pont Electric Blasting Caps—a result of Du Pont research—represent the greatest advancement in the manufacture of electric blasting caps in over 50 years! Your Du Pont Explosives representative will show you samples. Don't run the risk of dangerous and costly misfires. Use Du Pont Caps exclusively. *Remember—the most dependable detonator is the safest detonator.* E. I. du Pont de Nemours & Co. (Inc.) Explosives Department, Wilmington, Delaware.

DU PONT
REG. U. S. PAT. OFF.

**DU PONT EXPLOSIVES** BLASTING SUPPLIES AND ACCESSORIES

# Coal Mining News

# KENNAMETAL UNDERCUTTER BITS CUT 35 PLACES (before regrinding) WHERE OTHER BITS AVERAGED ONLY 1

35 places cut between resharpenings through coal having clay veins—that's the average performance of Kennametal Bits in just one Pennsylvania coal mine. Furthermore, in nearby areas, where the face is clean, Kennametal Bits are cutting up to 250 places between resharpenings!

Before Kennametal Bits were used, operations in the mine had been seriously delayed because the previously used bits could cut, on the average, only one place, and then would have to be removed from the chain.

***Why do Kennametal Bits make cutting-in operations practicable where previously the cost was prohibitive? Why do they retain their edge, and cut far more footage?***

Because the cutting edge is Kennametal—the tough, durable tool material that is exceptionally hard (75 Rockwell C compared to 66 for hardest tool steels).

***What do Kennametal Bits cost?***

Their first cost is higher than that of other bits, but their ultimate cost is insignificant, taking into consideration the economies effected through their use.

***Want to increase the productivity of your mining machines, and their crews?***

Test Kennametal Bits under your operating conditions —and compare results. A note from you brings catalog particulars and prices, or our mining engineer—whichever you say.

**KENNAMETAL**

SUPERIOR CEMENTED CARBIDES

TRADE MARK REG. U. S. PAT. OFF.

KENNAMETAL Inc., LATROBE, PA.

## CHAINS FOR WHICH KENNAMETAL UNDERCUTTER BITS ARE DESIGNED

| U1 | U2 | U3 | U4 |
|---|---|---|---|
| Short or Longwall Machines | Number 50, 52, 54 Chains | Mtd. Track or Rubber-Tired Gage | Mtd. Track or Rubber-Tired Gage |
| Cincinnati | ..... | Cincinnati | Cincinnati |
| Goodman | Goodman | Goodman | Goodman |
| Jeffrey | ..... | Jeffrey | Jeffrey |
| Prox | ..... | Prox | Prox |
| Sullivan | ..... | Sullivan | Sullivan |
| Tracy | ..... | Tracy | Tracy |

## *Also Available*

Six sizes of two-way Kennametal-tipped drill bits—1⅜", 1⅝", 1¾", 2¼", 2½", and 3"—to increase production rates and reduce costs of mechanical drilling operations. Solid-center, double-spiral augers that minimize whip, and make fullest use of the advantages inherent in Kennametal-tipped Drills, are made by us for use with all six sizes of bits.

# For more working horsepower

# . . . and less engine weight . . .

# your best investment in power is

# a Cummins Dependable Diesel!

Within almost the same weights and mounting dimensions, your choice of 150-200-275 hp . . . weights as low as 10½ lbs. per horsepower . . . for all types of heavy-duty earth moving and material handling equipment. Illustrated here is the 150 hp (max.) Model HBI-600 Cummins Dependable Diesel.

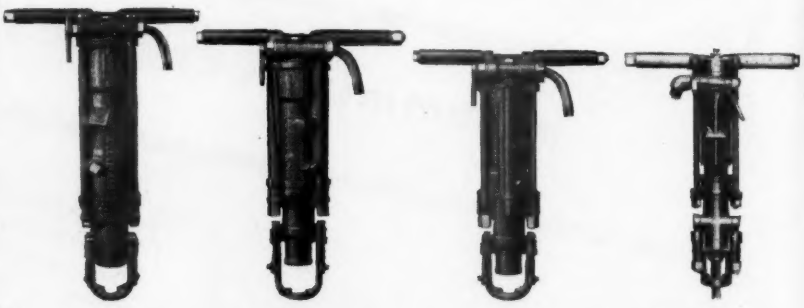
CUMMINS ENGINE COMPANY, INC.
Columbus, Indiana

# Cleveland Sinkers

## PACK A MIGHTY WALLOP!

In addition to their remarkable [illegible], Cleveland Sinkers are [illegible] and every one tested for air consumption. Many sizes, in wet or dry [illegible] for [illegible] drilling in every type of rock. Available with chucks for collared [illegible] steel, and plain or lugged shanks. Drop forged construction insures super strength. End-seating valve (used on most models) improves with use, prevents greater air consumption as drill grows older. • Mountings available for Models H111 and H10 for conversion to drifter type drills, used on column arm or tripod. • Be sure to use these sinkers with the Cleveland Accessories shown here. *Remember, the most efficient rock drill delivers even better performance when equipped with the proper, high-quality accessories.*

**Write for Bulletin 122 on Sinkers—Bulletin AC-11 on Accessories**



**Model H23, 83 lbs.**
**For extra tough drilling.**

**Model H111, 55 lbs.**
**An all around favorite.**

**Model H10.**
**Leader in the 45 lb. class.**

**Model H66, 32 lbs.**
**Light but powerful.**

## FOR BEST RESULTS USE

## CLEVELAND ACCESSORIES

**"Veribest" Air Hose is extra tough, withstands rough treatment.**

**Cleveland Air Filters prevent fine trash from entering your drill.**

**Cleveland Line Oiler keeps drills amply lubricated and working at top speed.**

**Hose Clamp Tool is handy and efficient for securing wire clamps to hose and fittings.**

**Type "A" Couplings are made of a tough, rust-proof, bronze alloy. Quick-acting.**

## LEADERS IN DRILLING EQUIPMENT

**CLEVELAND ROCK DRILL DIVISION**
**THE CLEVELAND PNEUMATIC TOOL CO.**
**CABLE ADDRESS: "ROCKDRILL"**
**CLEVELAND 5, OHIO**

**BRANCH OFFICES**

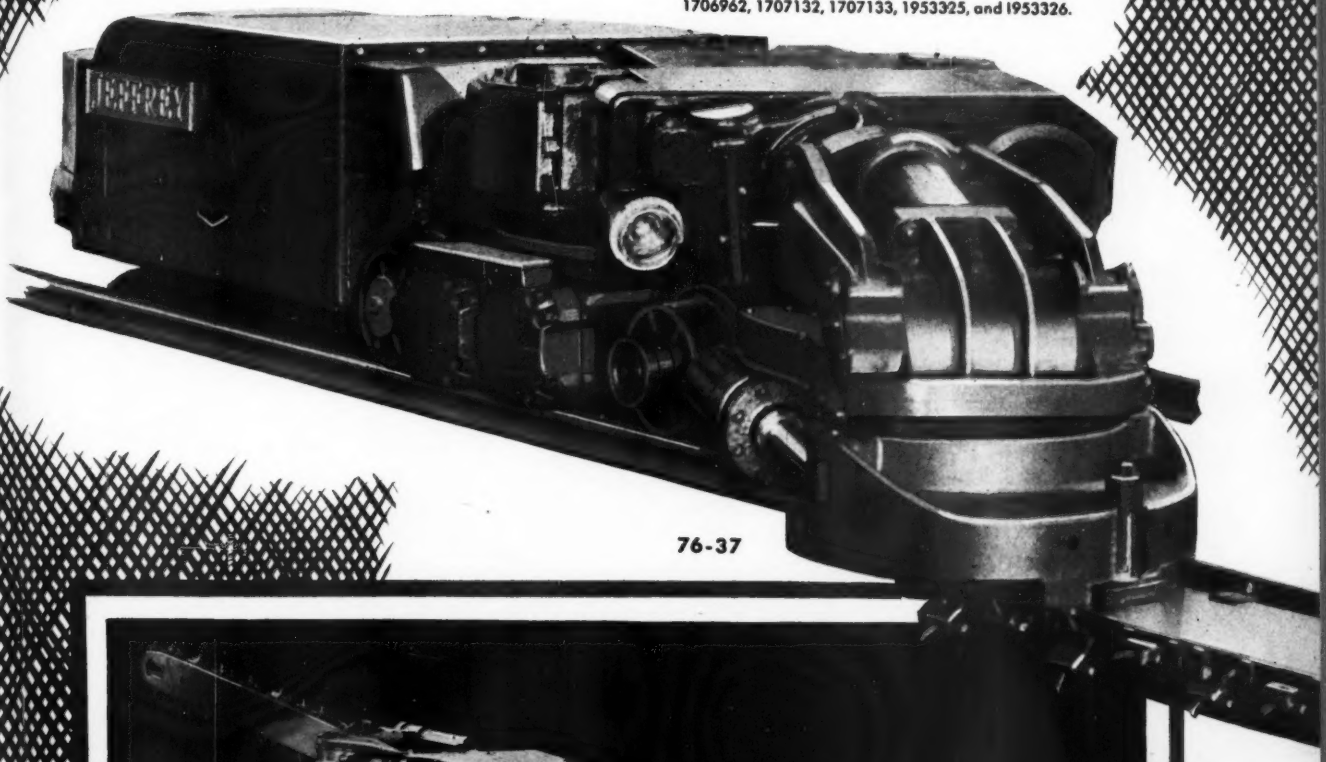
Birmingham 19, Ala.
Butte, Mont.
Dallas 1, Texas
Denver 2, Colo.
El Paso, Texas
Ironwood, Mich.
Lexington 19, Ky.
Los Angeles 11, Calif.
Newton Highlands 61, Mass.
New York 6, N. Y.
Pasadena 8, Calif.
Philadelphia 32, Pa.
Pittsburgh 22, Pa.
Salt Lake City 1, Utah
San Francisco 3, Calif.
St. Louis 3, Mo.
Wallace, Idaho
Washington 5, D. C.

**CANADIAN DISTRIBUTORS**

Purves E. Ritchie & Son, Ltd., 658 Hornby Street, Vancouver, B. C.
Industrial Machinery Co., Ltd., 163 N. Water St., Halifax, Nova Scotia

# JEFFREY 29-U COAL

Patented and Patents Pending. Also licensed under the patents of E. C. Morgan. Patents Nos. 1706961, 1706962, 1707132, 1707133, 1953325, and 1953326.



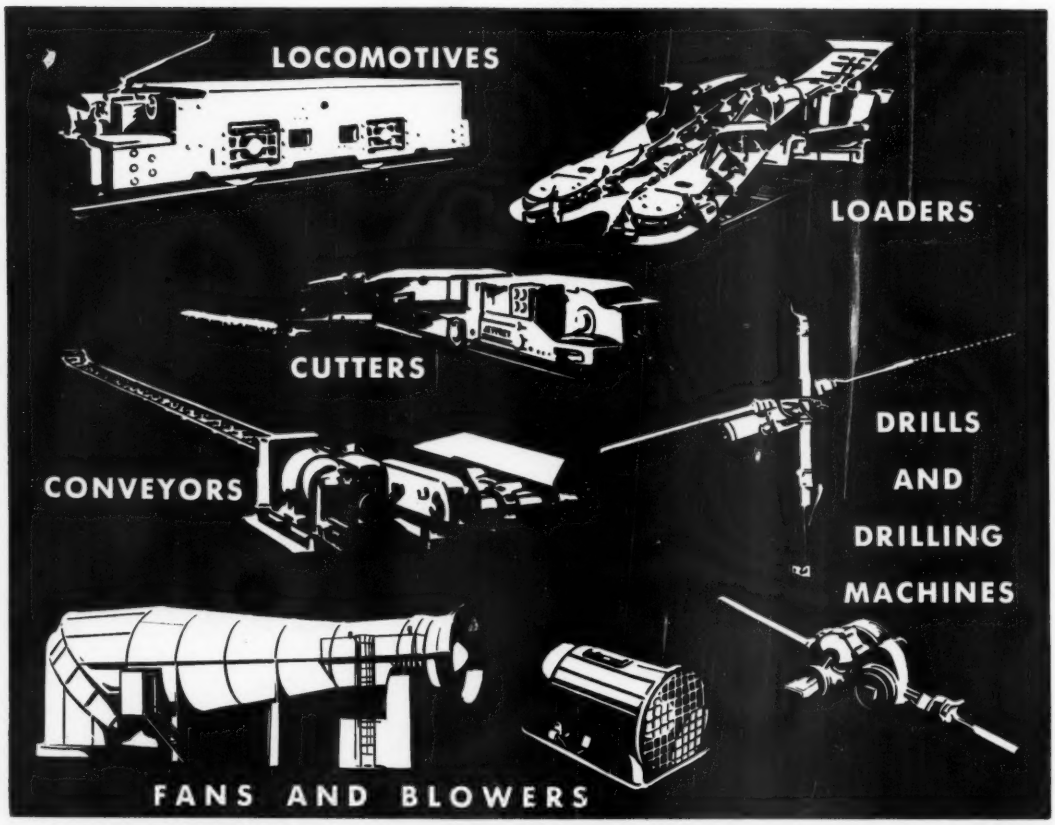

76-37

58-37

# Jeffrey

# EQUIPMENT FOR COAL MINES

## JEFFREY SERVICE TO THE COAL MINES MEANS SERVICE TO ALL INDUSTRY




## THE JEFFREY MANUFACTURING COMPANY

*Established in 1877*

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

| | | | | | |
|---|---|---|---|---|---|
| **Sales Offices:** | Baltimore<br>Birmingham<br>Boston<br>Buffalo | Chicago<br>Cleveland<br>Cincinnati<br>Detroit | Denver<br>Harlan<br>Houston<br>Huntington | Milwaukee<br>New York<br>Philadelphia<br>Pittsburgh | Scranton<br>St. Louis<br>Salt Lake City |
| **Service Stations:** | Pittsburgh<br>Harlan, Ky. | Birmingham<br>St. Louis | Logan-Beckley<br>W. Va. | Scranton | |
| **Foreign Plants:** | Jeffrey Mfg. Co., Ltd.<br>Montreal, Quebec | British Jeffrey-Diamond, Ltd.<br>Wakefield, England | Jeffrey-Galion (Pty), Ltd.<br>Johannesburg, S. A. | | |

# FREE every month... your personal copy of O-B "Haulage Ways"

## Would you like to...

...keep up-to-date on the best ways to install and use O-B Mining Materials?

★

...read interesting articles as to how other mines are using O-B Materials effectively?

★

...know how O-B Mining Materials can help you produce more tonnage at less cost.

★

...have complete engineering data on new O-B products as they are released?

To obtain information such as this, simply fill out and mail the coupon on this page. The postman will bring you a personal copy of O-B Haulage Ways twelve times a year, each packed with helpful information. If you are charged with the responsibility of installing, specifying or ordering trolley line materials, rail bonds, mine car couplers, motor starters, distribution boxes and similar materials, ask to be placed on the Haulage Ways mailing list. Send the coupon today.

2704-M

**Clip and Mail this Coupon for Helpful Information on O-B MINING MATERIALS**

**Ohio Brass**

**MANSFIELD, OHIO**

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ontario

**Ohio Brass Co., Mansfield 3, Ohio**

**YES!** I'd like to receive copies of O-B Haulage Ways regularly every month. Please add my name to your mailing list.

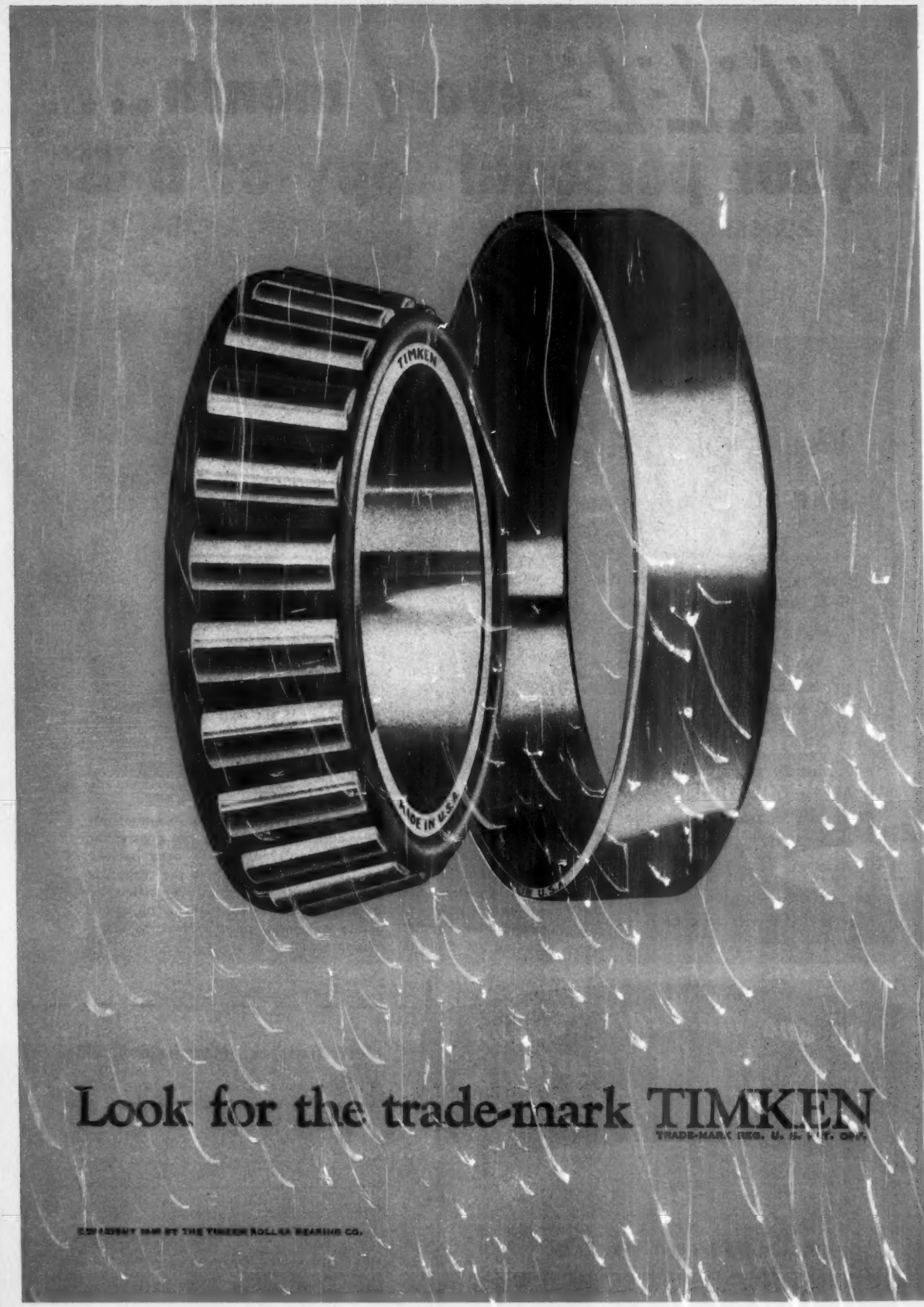
Name_____

Title_____

Company_____

Address_____

City_____ Zone_____ State_____




Look for the trade-mark TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

COPYRIGHT 1948 BY THE TIMKEN ROLLER BEARING CO.

# ...Both need WAR HEADS

The effectiveness of the flying bomb depends upon the warhead in its nose — a 2000 lb. charge of explosive. All of the intricate mechanism in this weapon — the gyroscope compass, jet propulsion, and automatic pilot — merely serves to deliver the explosive to its destination.

In a similar way, the precision manufacture and the unique valve design of the DA-35 Drifter serve only to develop the power necessary to drive a bit into the rock. Despite the fact that the high drilling speed of this machine has enabled it to establish new tunnel-driving records, the use of a proper warhead — a Jackbit — is essential to peak efficiency.

For example, on one job the drilling rate of DA-35 Drifters was increased from 16 to 22 inches a minute when Jackbits were put to work. On another job Jackbits reduced the time per round drilled by 26%.

## JACKBITS

**YOUR ROCK DRILLING WARHEAD**

*There's a size and style for every rock condition. They're backed by men who are rock drilling experts.*

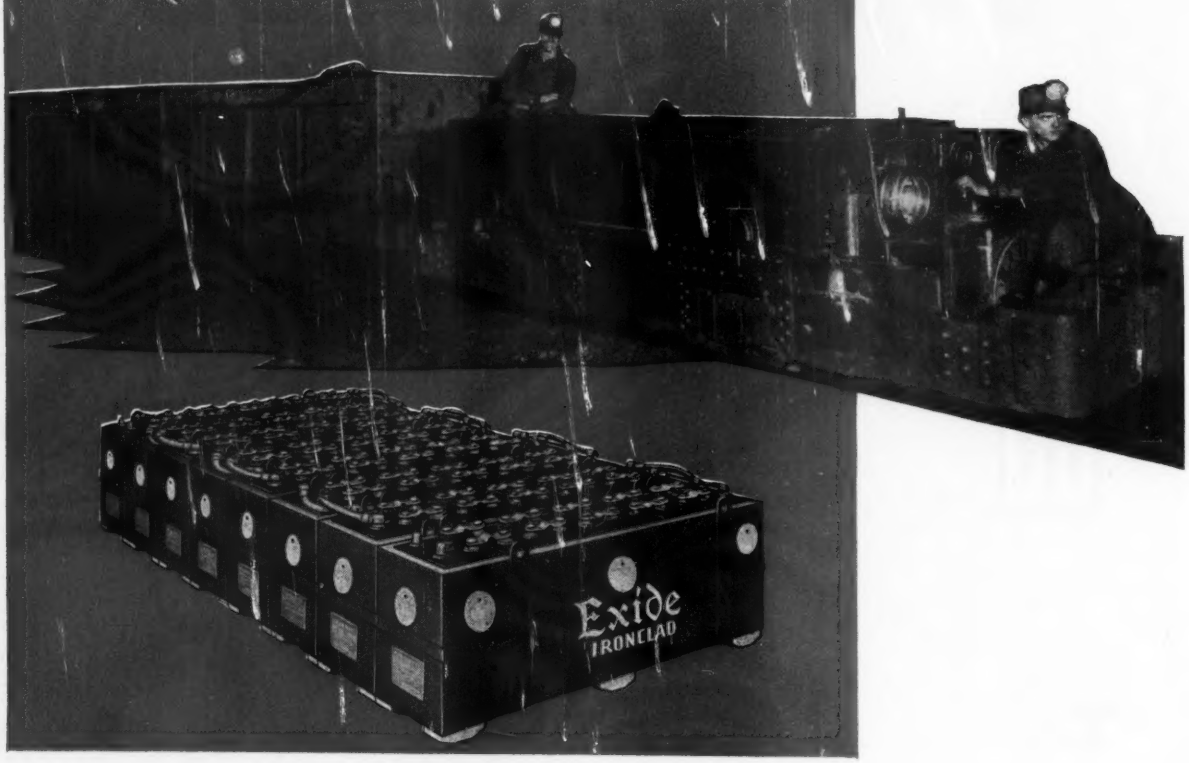
## Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 15-734

COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • OIL AND GAS ENGINES

# POWER

## EXIDE-IRONCLAD POWER ASSURES LOWER HAULAGE COSTS PER TON




The increased production and greater economy that result when haulage units are Exide-powered, are due to many factors. Chief among them are a *high power ability* which meets the increased kilowatt demands encountered in frequent "stop and go" service . . . a *high capacity* which keeps shuttlecars, locomotives and trammers operating at sustained speeds throughout each shift . . . and a rugged construction that reduces maintenance close to zero.

All factors combine to assure "full shift availability" and the natural results—greater production at a lower cost per ton, per man, per hour. You can always count on Exide-Ironclads for dependability, long-life, safety and ease of maintenance.

If you have a special battery problem, or wish more detailed information, write to Exide and ask for booklet Form 1982.

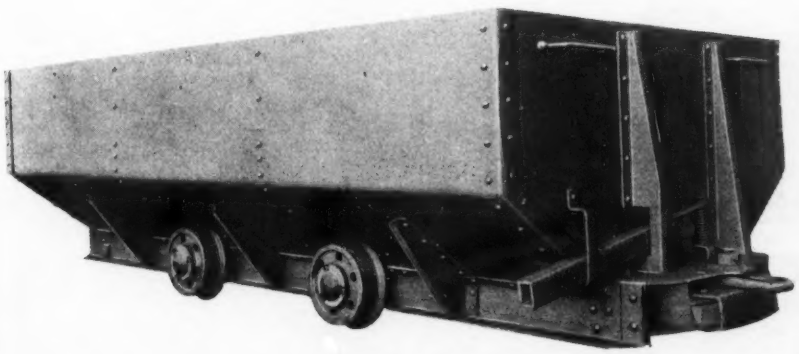
Exide
IRONCLAD
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

# Automatically

## unlatched, dumped and latched in 5 seconds!

***Seems Remarkably F-A-S-T! Doesn't it?***



Actual timing has shown that when dumping a 16-car trip of A.C.F. Drop-Bottom mine cars—"only 80 seconds elapse" from the time the first car is unlatched until the last car is latched. Automatically, of course! Meanwhile, as much as 80 tons of coal has been unloaded into the storage hopper. "A ton per second, unloading time!" Cars are returned to the mine immediately—saving precious minutes of loading time!

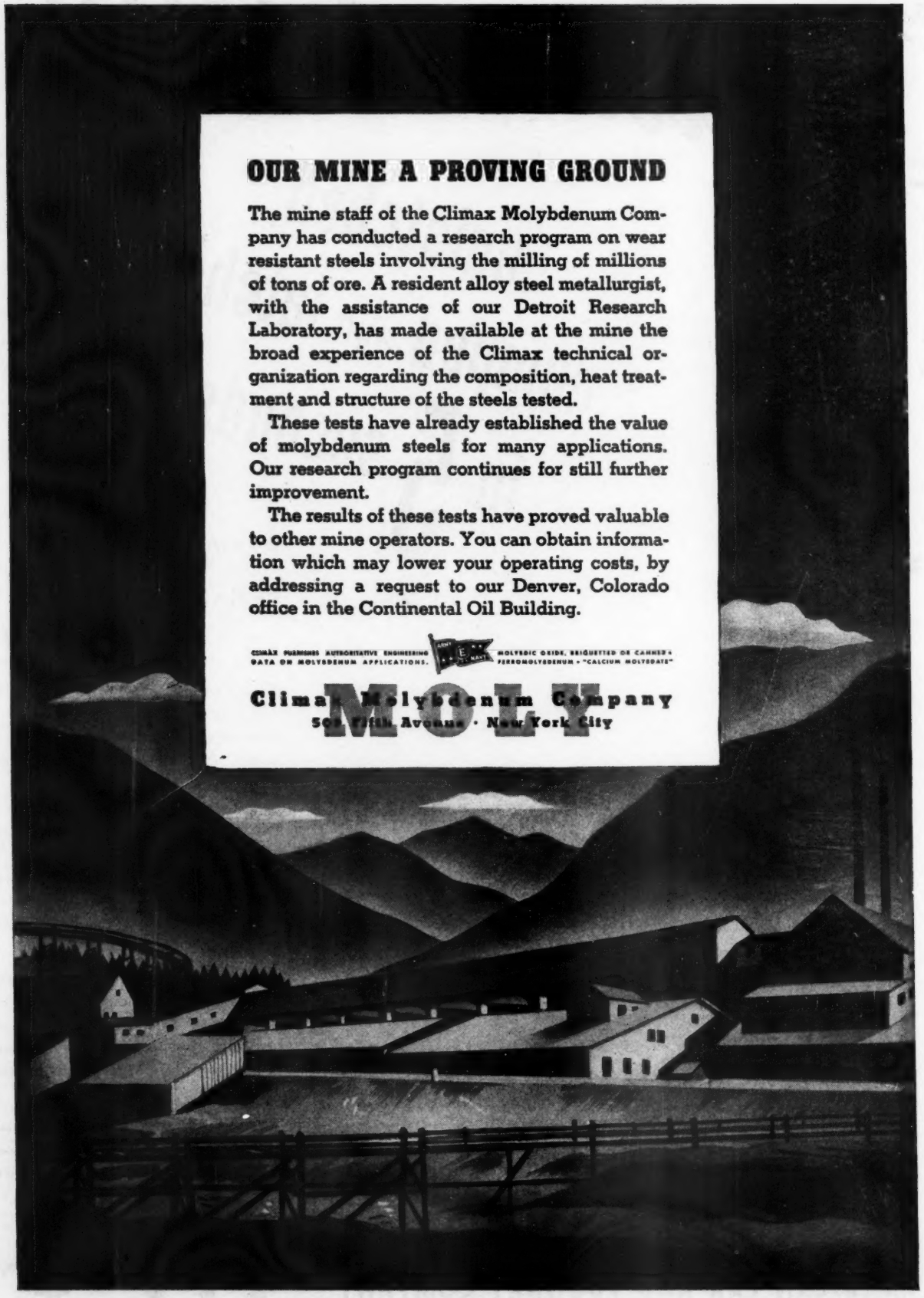
Such speed in dumping will certainly increase your daily output and lower your transportation costs! Why not investigate the possibilities of using A.C.F. Drop-Bottom mine cars in your mine?

Our Sales Representatives will be glad to discuss Drop-Bottom cars with you. Get in touch with our nearest Sales Office.

**AMERICAN CAR AND FOUNDRY COMPANY**

NEW YORK • CHICAGO • ST. LOUIS • HUNTINGTON, W. VA.
CLEVELAND • PHILADELPHIA • BERWICK, PA. • PITTSBURGH

a.c.f.


OUR MINE A PROVING GROUND
The mine staff of the Climax Molybdenum Company has conducted a research program on wear resistant steels involving the milling of millions of tons of ore. A resident alloy steel metallurgist, with the assistance of our Detroit Research Laboratory, has made available at the mine the broad experience of the Climax technical organization regarding the composition, heat treatment and structure of the steels tested.
These tests have already established the value of molybdenum steels for many applications. Our research program continues for still further improvement.
The results of these tests have proved valuable to other mine operators. You can obtain information which may lower your operating costs, by addressing a request to our Denver, Colorado office in the Continental Oil Building.
CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE, BRIQUETTES OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"
Climax Molybdenum Company
500 Fifth Avenue · New York City
MOLY

# GOVERNMENT SURPLUS STEEL

## AVAILABLE NOW THROUGH RFC

## Liberal Price Reductions

This is an unusual opportunity for many manufacturers to get ahead in their reconversion program. While some of the sizes, shapes and alloys of the RFC stock of surplus steel may differ from the specifications of normal industry requirements, it has the advantage of being quickly available.

Attractive allowances have been made in our pricing program to move this steel into the hands of private industry.

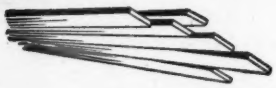
### HOT ROLLED PLATES

**Carbon and Alloy.** Wide range of sizes from ¼" to 6" thick, up to 96" wide.

### TOOL STEEL

**7,000 tons.** In Water-hardening, Oil-hardening and High Speed grades. Large range of bar sizes.

### STRIP STEEL



Available in Hot Rolled and Cold Rolled, Carbon and Alloy. Large quantity of High Carbon Cold Rolled Strip—to be sold at low Carbon prices—or lower. Large range of sizes.

### BAR STEEL

Hot Rolled and Cold Finished in both Carbon and Alloy. Rounds, squares, flats and hexagons in various specifications. Many items in large quantities.

***Write, wire or phone your requests to the nearest RFC agency listed below for more detailed information. If you desire, credit terms can be arranged. If your local office does not have all the materials you need, it will endeavor to locate them from other offices throughout the country.***

## CHECK THIS LIST

### Miscellaneous STEEL PRODUCTS

1. Carbon and Alloy Billets, Blooms, Slabs, Skelp, Rods, etc. . . . ☐
2. Reinforcing Bars . . . . . ☐
3. Structural Steel Shapes . . . . ☐
4. H. R. & C. R. Sheets, Strip Steel, Carbon and Alloy . . . . . ☐
5. Plates—Tin Plate, Terne Plate, Black Plate . . . . . ☐
6. Wire and Wire Products, Carbon and Alloy, Wire Rope, Reinforcing Wire Mesh . . . . . ☐
7. Stainless Steel Sheets, Strips, Standard Types . . . . . ☐
8. Iron and Steel Pipe, and Tubing—Valves and Fittings . . . . ☐
9. Mechanical Tubing, Carbon and Alloy . . . . . ☐

Name.....

Firm.....

Address.....

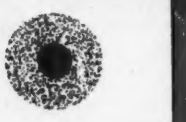
## RECONSTRUCTION FINANCE CORPORATION

*A Disposal Agency Designated by the Surplus Property Administration*

**Agencies located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cleveland • Dallas • Denver Detroit • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville Minneapolis • Nashville • New Orleans • New York • Oklahoma City • Omaha • Philadelphia Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane**

157-1

# WHAT ARE YOUR *Battery Replacement* COSTS?



**BLACK OXIDE**
Made by a special Gould process each grain of Black Oxide active material has a core of pure lead. Normal cell action converts this to active material as needed.

GOULD STORAGE BATTERIES CORPORATION, Depew, N. Y.

Factories: Atlanta • Boston • Chicago • Dallas • Depew • Leavenworth • Los Angeles • North Bergen • Rockford • Saint Paul • Salem • Sioux City • Zanesville

Gould Kathanode power will speed your mine shuttle car operation throughout the entire service life of the battery. You will not have to replace it because of failing power after a few months of use.

One reason why Gould delivers 100% or more of its rated capacity through years of service is the large positive plate filled with Black Oxide active material. Developed by Gould engineers this active material has unique regenerative properties. As the outer surface is used up new material takes its place. Capacity is maintained.

Avoid operational slow-downs and premature battery replacement by powering with Gould. Write Dept. 131 for Catalog 300 on Gould Kathanode Glassklad Batteries for Mine Shuttle Car Service.

GOULD
KATHANODE

# Salute to THE MINING INDUSTRY

During 1944-45, Union Pacific paid tribute to American industry on its radio program "Your America", broadcast each week over a nation-wide network. Representatives of 70 major industries were given the opportunity to present the dramatic story of their respective industry's contribution to the welfare of the nation.

**For example, on one program our guest speaker was A. G. Mackenzie of Salt Lake City, representing the Utah Metal Mine Operators' Association. Guest speakers on other programs were Roger Straus of New York City, representing the American Smelting and Refining Company; and Captain Kenneth G. Castleman of New York City, representing the Aluminum Association.**

Union Pacific—along with other railroads—was then engaged in moving vital wartime materials. Your industry and the nation generally knows what a tremendous task that was and how efficiently it was accomplished.

Today, Union Pacific is prepared to continue its assistance to your industry by speeding the distribution of peacetime commodities. Equipment, facilities and personnel are geared to provide unexcelled service.

**A staff of trained traffic men stand ready at all times to cooperate with you.**

For fast, dependable service . . . .

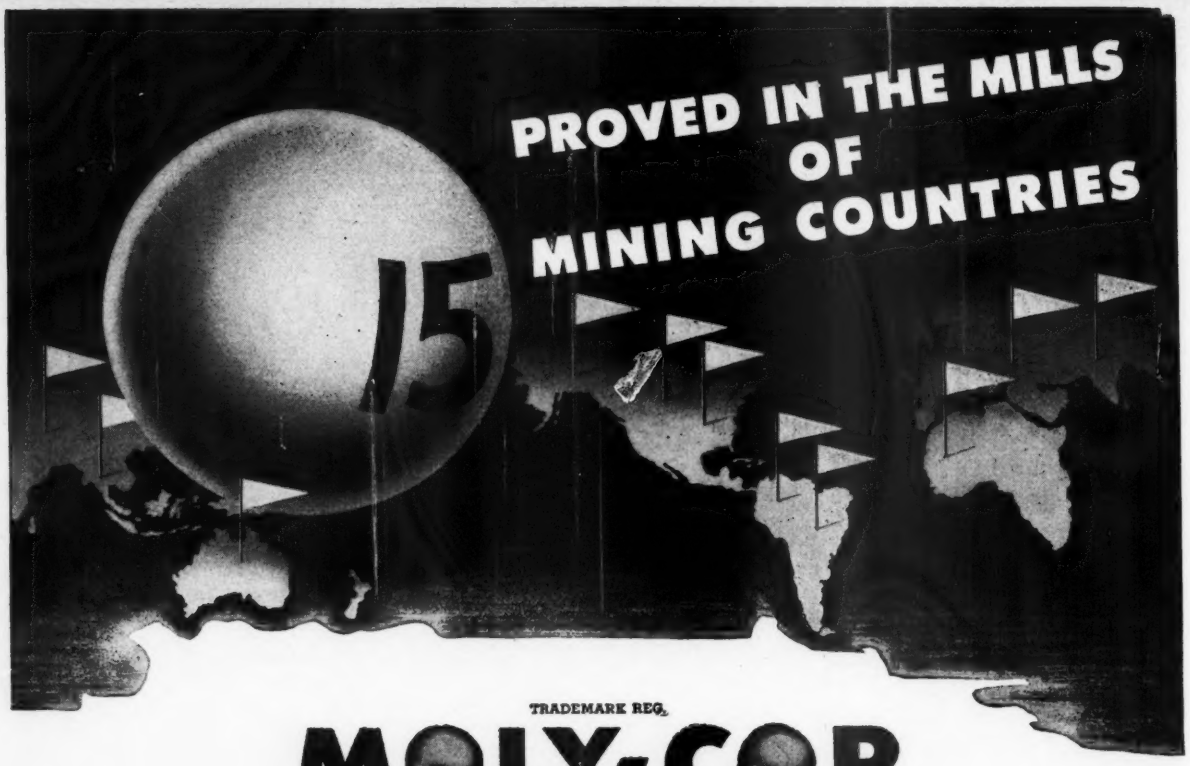
*Be Specific— say "Union Pacific"*

★ *Union Pacific will, upon request, furnish information about available industrial and mercantile sites in the territory it serves. Address Union Pacific Railroad, Omaha, Nebraska.*

*The Progressive*

**UNION PACIFIC RAILROAD**

*The Strategic Middle Route*




TRADEMARK REG.

# MOLY-COP

COPPER-MOLYBDENUM-ALLOY

# GRINDING BALLS

## Increase Grinding Efficiency—Lower Grinding Costs

Mills throughout the United States and 14 other mining countries have found the easiest way to lower grinding costs, make profitable the milling of lower grade ores and obtain a finer grind with the use of Sheffield MOLY-COP Grinding Balls. Developed from a special alloy steel, forged and heat-treated, Moly-Cop Balls are tough and hard right to the core. That's why Moly-Cop Balls won't spall or flake. They retain their shape, give far more tons of ore per pound of balls. Handling, freight, mill liner and other milling costs are decreased, production increased, with Moly-Cop Balls

***SHEFFIELD STEEL***

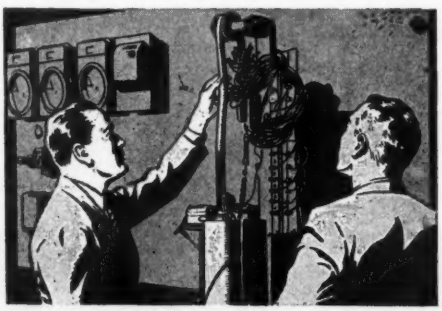
**SHEFFIELD STEEL CORPORATION**
**SHEFFIELD STEEL OF TEXAS**
KANSAS CITY, MISSOURI — HOUSTON, TEXAS

Export Representatives
Canada—The Canada Ingot Iron Company, Ltd.
Guelph, Ontario, Canada

All Other Countries—
THE ARMCO INTERNATIONAL CORPORATION
Middletown, Ohio

Sub-distributors in Mexico: La Consolidada

It doesn't take much "tortional twist" to make a cat meow "Uncle." But that's just a gentle caress compared to what our laboratory boys do in testing U.S. Royal Mining Machine and Locomotive Cables. Add to the twisting indignity, punishment by impact, compression, heat, cold and immersion in water, and you'll understand what is expected of U.S. Royal wires and cables.



## THIS IS THE TWIST TEST

**A 42-inch length of cord, sizes 18 to 10 Awg., is twisted through 180° in each direction while supporting a 50-pound weight and while being pulled back and forth over a 3" diameter pulley (top pulley in illustration) at the rate of 15 cycles per minute. Electrical circuit in the cable indicates failure due to a short between conductors or a broken conductor.**

**Two-Conductor Royal Cords and Cables stand a minimum of 15,000 cycles of twisting in accordance with the above test.**

**SPECIFY THE NEW U. S. ROYAL *Safety Tested* MINING MACHINE AND LOCOMOTIVE CABLES**

# UNITED STATES RUBBER COMPANY

**1230 AVENUE OF THE AMERICAS • ROCKEFELLER CENTER • NEW YORK 20, N. Y.**

***SERVING THROUGH SCIENCE WITH ELECTRICAL CORDS AND CABLES***

Truco Reaming Shells are expertly made and held to exact tolerances. They ream accurately and clean and hold gauge so that low reaming costs are assured. In many cases, a Truco Shell, run behind a Truco Bit, prevents injurious vibration and contributes to longer bit life.

As in the case of Truco Bits, drillers prefer Truco Shells, particularly when drilling deep holes, because they are dependable. Truco Bits and Shells are made to fit each other, so that there is no step-up between the blank sizes. This insures long shell life by allowing the sludge to pass away freely and prevents it binding around the shell.

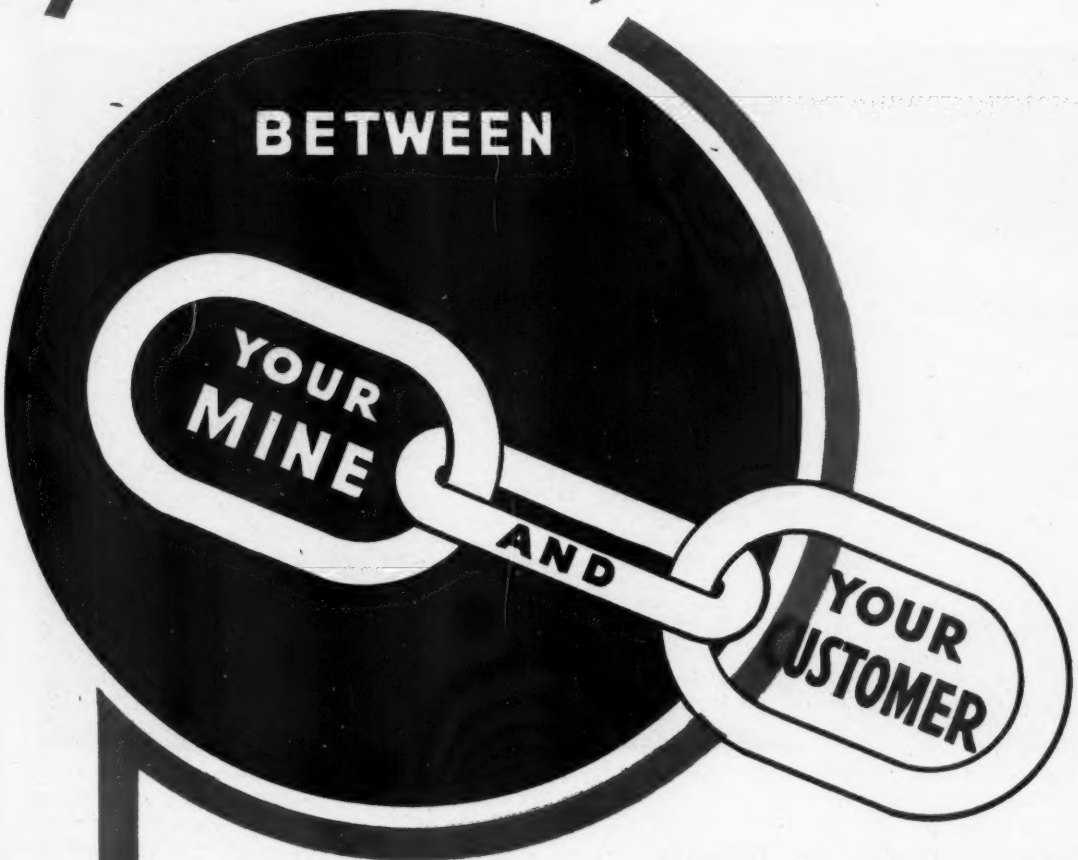
The wear-resisting and diamond-gripping properties of the Truco patented matrix metal in which the diamonds are set and the excellent quality of the diamonds themselves, insure utmost durability, economy and satisfaction from the use of Truco Reaming Shells.

**WHEEL TRUEING TOOL COMPANY**

3200 W. Davison Avenue
Detroit 6 • Michigan

575 Langlois Avenue
Windsor, Ont. • Canada

# *How strong* IS THE SALES LINK




Only coal that is applied in places and plants where it works best will remain sold when competitive conditions return in the coal industry. Only intelligent merchandising can provide such applications. The Cliffs organization, throughout twenty-six states and Canada, is equipped to provide your coal with exactly that type of distribution.

*Your coal must have the right customer:*
*your customer must have the right coal*

**THE CLEVELAND-CLIFFS IRON COMPANY**

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

# AMERICAN CABLE SLINGS are ACCO Registered

American Cable proof-tests every Registered sling to twice its safe-working load, before it leaves the mill. You then receive a Certificate of Test and Registry for known, predetermined strength and safety. Every sling, so registered, is identified by a metal registry tag which states maximum safe load, date of testing, and registration number. This is the biggest advance ever made toward proper wire rope sling application and working safety. Specify American Cable's ACCO-Registered slings—made of TRU-LAY Preformed Wire Rope of Improved Plow Steel.

ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Emlenton, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

*In Business for Your Safety*

Mining
CONGRESS JOURNAL

*Published for the Entire Mining Industry by The American Mining Congress*

Volume 32 JANUARY, 1946 Number 1

## Mining in 1946

THE FIGHTING war is over. The mining industry is fully justified in feeling an honest pride in having done its part. There were dark days in the early months and years of the war, when it was far from certain that the needed tonnages of metals and minerals could be obtained for the manufacture of vital munitions. The industry went all out, to the last man, for production, and our country and its allies triumphed in the most trying tests of arms of all times. With its fighting job well done, the industry now returns to the ways of peace.

There is every confidence throughout the country that the demand for the products of the mines will continue to be great, particularly when reconversion is completed and business enterprise hits its full stride.

While mining has been hurt through the using up of reserves in its all-out participation in the war, the industry has not been disabled. The development of new ore bodies and new mines is far behind and if there is to be the needed amount of exploration, development, bringing into production of new mines and expansion of going mines, constructive action must be initiated quickly. First and foremost the current high wage rates must be accompanied by a higher degree of efficiency and greater productivity on the part of labor. The enactment of arbitrary, unwise labor legislation will have to be checked and a number of harmful labor statutes of the past ten years amended to place management and labor on an equal and fair footing. Price ceilings on metals and minerals must be lifted, certainly by June 30, when the statutory authority lapses, if not before. Materials held in Government stockpiles against the danger of another war must not be released without the express approval of Congress. Domestic mines must be protected by a tariff adequate to offset richer natural deposits, lower labor costs, lower exchange rates and the operation of cartels in foreign countries. Foreign trade must not be stimulated at the expense of our mining industry.

There must be no further expansion of the Government leasing system on the public domain, extending bureaucratic control and exacting royalties from prospectors and locators who for a hundred years have discovered and developed the metals and minerals of the Nation. The stringent financing restrictions of the Securities and Exchange Commission must be eased to attract venture capital to the industry.

The mining industry has uncomplainingly borne its share of the tax burden in the years of emergency. It will continue to do so in the years of peace. These burdens must be lowered as rapidly as possible and the Congress has taken a constructive first step in repealing the excess profits tax, and the capital stock tax, and in making slight reductions in other taxes. The words of Treasury Secretary Vinson sound a governing principle to guide in tax legislation—

> "Taxes should be levied in such a way that they have the least harmful effect on the expansion of business investment and the creation of jobs, because productive employment is the source of our standard of living, of all income, and of the revenue which the Government collects from taxes."

There is encouragement in the White House announcement of plans to balance the Federal budget in 1948 and in the Administration's proposal to cut the budget for fiscal 1947 from $50 billion to $38 billion. The wherewithal to furnish necessary revenues for balancing the budget will be forthcoming if the restraining shackles are dropped from mining and other basic industries of the Nation.

## Enact the Stockpiling Bill

THE SENATE has passed S. 752, the Thomas-May stockpile bill. This measure, so important to the national defense, is now under consideration in the House Committee on Military Affairs. The mining industry has learned by hard experience in two wars that retention by the Government of stockpiles of critical and strategic materials is vitally needed to meet the tremendous surge in requirements for munitions production that takes place during a major emergency. Such stockpiles must be held inviolate against any future military emergency, with recourse to their precious materials only when this country is threatened with war or involved in war. Their very existence may save the Nation from attack. Stockpiles are a form of national insurance, and in the fortunate event that we are never called upon to use them they will have paid for themselves many times over.

In the form now before the House Committee the bill specifies that Congress shall retain control over the stockpile. Unless the stockpiling accumulations are securely locked up, with Congress itself holding the key, they will inevitably have an unhealthy and repressive effect on the mining industry. Any power given an administrative agency to liquidate portions of the stockpiles—thus creating constant uncertainty and destroying confidence in the future—would jeopardize the maintenance of a strong, healthy industry, engaged continually in developing new reserves and new metallurgical processes, and possessed of the equipment, organization, and "know-how" that will be indispensable in another emergency. It is therefore of the most vital importance that the members of the House Committee on Military Affairs stand firmly for the proviso in the pending bill: "That no material constituting a part of the stockpile may be disposed of without the express approval of the Congress except where the revised determination is by reason of obsolescence of that material for use in time of war; . . ."

S. 752 should be enacted in a form which will not do violence to the Nation's "basic stockpile"—a sound and healthy mining industry.

# Top Cutters In Mechanized Mines

## Some Advantages of Top-Cutting Practice—With Historical Notes and Examples

By P. R. PAULICK
Consulting Mechanization Engineer

IT no doubt seems odd that a confirmed mine mechanization engineer would want to talk "top cutters" rather than mechanical loading systems as such—for instance, describe some outstanding installation or operation wherein conveyors, or mobile loaders, or a combination of both, is making history—setting new records. However, just for this occasion, I will step out of character and forego the discussion of a specific mechanized installation but will talk instead about important supporting auxiliary equipment to mechanical loaders; namely, top cutters, or better still, universal cutters. For the gradual evolution of the originally designed top cutter resulted in today's highly efficient "universal cutters" capable of cutting anywhere in the seam from top to bottom and shearing any place in the seam. Top cutters and/or universal cutters are now an important adjunct to good mechanization practice especially in tender or even medium good roof areas of the American coal fields. Personally, I am convinced that the advent of universal or top cutters as auxiliary supporting equipment to mechanical loaders (both mobile type and conveyors) is one of the most important advances made in coal mining practice and antidates even the birth of mechanical loading itself. This paper was written solely to develop this thesis and to attempt to prove these contentions by example arguments as experienced by the writer in several states.

### Advantages of Top Cutting Versus Bottom Cutting

Generally speaking, I think most of you, especially those who have experienced bad or tender roof conditions, will agree with me that top cutting—especially with the addition of shearing—has many advantages over the old method of cutting coal at the bottom of the seam. However, I do concede that certain coal seams exist wherein bottom cutting is preferred over top cutting. For instance, coal seams having a dirt band at or near the bottom, coal seams with exceptionally good, hard roof, etc. But as a whole in coal seams having a weak or tender roof, and coal seams with dirt in upper levels, etc., top cutting has many distinct advantages, some of which are enumerated below. You men may know of others, if so, I would appreciate it if you would voice them—for the record:

1. Better timbering and roof control methods possible due to the even and smooth roof made by top cutters, and possibility of eliminating *all* posts from entry development work by making "hitch" holes for the crossbars during the cutting operation. Very helpful when using mobile loaders in developing entries.
2. Better roof control due to strengthened roof by leaving a small amount of roof coal to help support the overlying weak rock strata. This is especially true in coal seams having a dirt band, boney, or sulphur streak in the top part of the coal seam that can be left up and utilized as a supporting agent for the overlying strata until timbers can be set.
3. In many cases improved quality of coal, especially in coal seams where best cost exists in top half of the seam. Bottom shooting does not shatter the good coal. However, the reverse can be true and this advantage exists only in special cases.
4. Top, or more correctly, "universal" cutters permit the practice of selective mining in coal seams having beds or streaks of impurities in the seam itself. It is conceded here that this is not a purely top cutting operation but we have said that the present day evolution of the first top cutters (with the exception of the special purpose Goodman 712 top cutting shortwall) has developed into the combination top cutting, bottom cutting and shearing machine, or the UNIVERSAL cutter, as it is now known. However, it must also be pointed out that this selective mining operation was not possible until the top cutters were invented, which then evolved into the present universal cutters.
5. Top cutting permits removing the shattering effect of the explosives from near the tender or weak roof to the bottom of the seam—thereby strengthening or rather preserving the original strength (if any) of the roof structure.
6. Combination universal cutters, track or rubber mounted, speed up the cutting operation cycle just by being inherently stronger and faster machines, and second by eliminating the useless time-consuming elements inherently existing in shortwall cutters: unload machine, pull to face, set and reset pipe jacks, prepare to set up, loading machine, etc. The inherent capacity of universal cutting machines over that of shortwall is 2 to 1 and in favorable conditions 3 to 1.
7. Possibility of reducing face preparation cost of a loading crew due to the increased capacity of the universal cutter permitting larger capacity loaders

Presented to Monongahela Valley Coal Mining Institute, Morgantown, W. Va., November Meeting, 1945.

to be used with proportionately greater daily output, or in some cases elimination of drillers by having the cutters do the drilling. This last is dependent upon the size and type of loader being used in a given coal seam.

No doubt there probably are several more advantages I have failed to mention, but the above seven are enough in most cases to justify the difference in capital expenditure required between the ordinary shortwall cutter and a modern high-speed universal cutter, track or rubber mounted. Of course, it is understood that the two representative types of universal cutters, track or rubber mounted, can also be used as bottom cutters as well as top cutters. The only unit now manufactured (as far as the writer knows) as a purely top cutting machine is the Goodman 712 shortwall top cutter. It has only one function—top cut coal—no shearing, no bottom cutting. It was designed and developed solely to be used with conveyor mining and as such is a very good piece of equipment in mines where weak roof conditions exist and conveyor mining is practiced.

## Brief History

The history of top cutters, or rather the universal top and bottom cutting, and side or center shearing machines is interesting and dates back before the advent of even the loading machines. It seems that back in 1908 or 1909 thought was being given to the idea of eliminating the crude and heavy work operations associated with and needed in cutting a place with a breast or the shortwall cutters. In 1909 the Jeffery Manufacturing Company built and shipped a machine to southern West Virginia designed for and to be used to cut impurities in a seam existing above the actual floor level. This machine was known as the 29A. The first machine was very simple in that no power provisions were made to raise or lower the cutting unit, it had to be done by hand. An improvement on the 29A machine soon came out and was designated as 29-B. A third machine, 29-C, quickly followed, until finally today this company manufacturers a highly efficient combination top and bottom cutting and shearing machine known as the 29-U. This machine is track mounted.

Soon after the 29-A was designed the Goodman and Sullivan Companies came out with their own versions of top cutting machines. Today the Goodman Manufacturing Company has a track mounted unit that top cuts, bottom cuts, and shears the coal. This machine is also track mounted and is known as the 1224 machine. In addition to this, the Goodman Company has recently developed and introduced a very efficient single purpose machine, the 712 shortwall top cutter. The writer believes this unit is destined to play an important role in conveyor mining systems in coal seams wherein the roof is weak or tender.

Paralleling the development of the above two companies, the Sullivan Machinery Company experimented with a top cutting and later with combination machines which included several CLU models; later the improved 7-AU model was developed, culminating in the recently announced and introduced 10-RU model mounted on rubber. The capacity of the 10-RU is such that where mining layout can be made to accommodate two loading machines, the 10-RU will cut coal for both. There is such an installation now in this vicinity, where the 10-RU cuts and shears coal for two caterpillar mounted loaders.

The major advancement in design and mechanical construction in the latest type universal cutters, represented by the 10-RU, is that the present day machines are completely hydraulically operated and controlled as to cutting functions. In the early machines, the rate of progress of the cutter bar through the coal seam was limited by a fixed gear train. In some cases the maximum allowable overload was limited by a friction in order to protect the gear train. All late models, however, are now hydraulically operated and controlled. And in the latest models the rate of cutting feed across the face is limited only by the hardness of the material being cut plus the ability of the cutting bits to stand up in whatever material the machine is cutting. In other words, if the coal is soft, the same machine can swing through the coal from 3 to 5 ft. per minute, and if the coal is exceptionally hard, the cutting rate of advance can be a fraction of a ft. per minute. Furthermore, by means of modern up-to-date electric control equipment the motors are now protected against serious overloads. Moreover, by means of a very efficient friction design the cutter chain drive mechanism itself is also protected against instantaneous overloads such as might be caused by stalling the cutter chain in the coal for any reason.

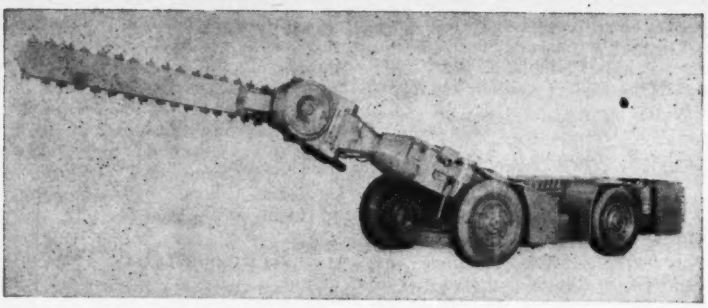
## Representative Types

Today there are three entirely different types of top cutters manufactured: first, the familiar track mounted model represented by the Jeffery 29-U, Sullivan 7-AU, and Goodman 1224 combination cutting and shearing machines. Second, there is the new rubber mounted universal cutting machine represented by the Sullivan 10-RU unit. And finally the special purpose shortwall top cutter represented by the new Goodman 712 unit. Each one of the three types has its field of application, and special adaptibility designed to work best in its natural field of operations.

Cutting out top slate parting

Naturally, the track mounted types are best adapted to be used with track mounted loaders. They have been used and are now used in combination with caterpillar mounted loaders. However, for best results track mounted cutters should be confined strictly to use with track mounted loaders.

The Sullivan 10-RU rubber mounted model is adaptable to driving entries, and mining room coal wherein a trackless mining plan and equipment are used. Like the track mounted machine this unit could be used with track loaders but again like the track cutters, best results will be obtained when it is used as companion equipment with caterpillar or rubber mounted loading equipment—trackless mining.



Universal cutter mounted on rubber tires

Lastly, while the Goodman 712 top cutting shortwall has limited range as to movement from place to place, etc., a large field of operation exists for this unit in conveyor mining practices or systems. It is ideal as a companion equipment to duckbill loading systems in tender roof mining area.

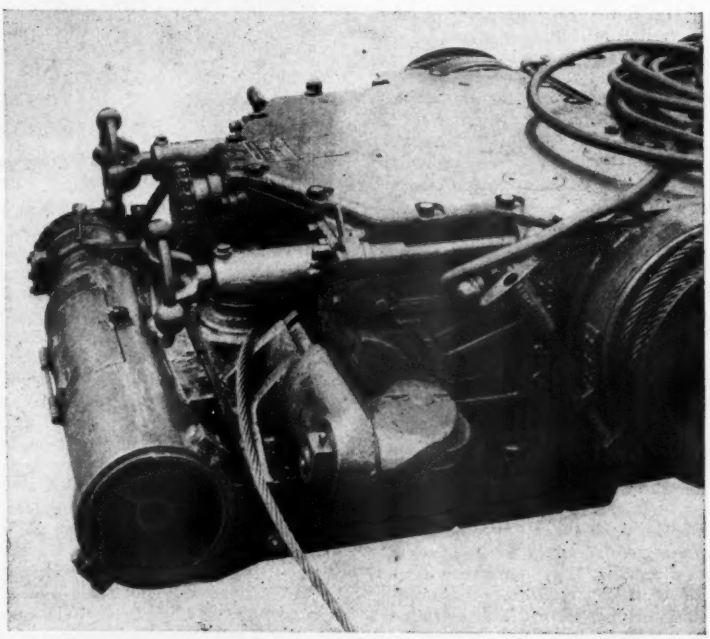
Because the 712 shortwall top cutter is comparatively new, and not generally known, it was thought appropriate to insert a short description of this unit here: The cutting element is supported on three independently controlled, single acting hydraulic cylinders which are mounted on a skid or baseplate resting on the floor of the mine. It is a two-unit machine with the actuating gear train at the front end and the power unit at the rear end. It can be equipped with either a 35 or 50 horsepower motor (direct or alternating current). Splash lubrication is provided to the mechanical unit by means of an oil bath, assuring thorough lubrication of all parts at all times, with consequent economical use of oil and maintenance cost. Brass bushings are used for centering the planetaries and for rope drums. All other load carrying bearings are of the anti-friction type. The machine is equipped with two rope drums, each being driven by a separate planetary providing independent variable high and low speeds for each drum. Rope drums, raising and lowering elements, endwise and sidewise tilt are all operated and controlled hydraulically. Power for these hydraulic operations is furnished by a single pump driven from the intermediate shaft.

The operation of the planetary cylinders is controlled by a rotary valve located on the left hand side of the machine. The rotary valve has two hand levers and each lever has five control positions: high speed, high speed blocked, neutral, low speed, and low speed blocked. Left hand rope drum is controlled by the left hand lever, and right hand rope drum by the right hand lever.

The raising and lowering of the cutting element as well as endwise and sidewise tilting is controlled by three levers actuating three push-pull valves located on the left side of the machine. Each lever independently controls a hydraulic cylinder, thus providing very close control of the bar while cutting, and enabling the machine to cut directly against the roof or to cut out dirt bands near the roof within close limits. It also permits the machine operator to keep the cutter bar in proper cutting position when machine is operating over bottom rolls.

The minimum height of this machine from floor to top of cutter bar is 27¼ in. This machine is equipped with standard 14 in. stroke hydraulic cylinders, giving it a cutting height of 41¼ in. Various other lengths can

Cutting to load top and bottom portions of seam separately



Bug duster on shortwall cutter collects the cuttings and reduces dust

be furnished up to a maximum of 6 ft. from the mine floor.

## Example Time Study—Conveyor Set-up

To show the effect of top cutting versus bottom cutting in mechanized operation, mining the Pittsburgh No. 8 seam, a summary of 10 time studies is submitted for your consideration and to more clearly illustrate the foregoing discussion. These studies were made in a 100 per cent mechanized operation using caterpiller mounted loaders for developing entries and shaker conveyors (10 units) loading onto a 30 in. belt for mining out room coal. All 10 shaker units working in one butt entry were studied but only the average of the 10 studies is used for this analysis.

Your attention is called to the writer's method of presenting the results obtained in making a series of observations. The summary of time studies is divided into four parts: "Productive working time" which includes all the productive work elements from preparing the coal face to loading it out. In the "Non-Productive" category is shown the portal travel time in and out, and any other non-productive time not chargeable to delays: for instance, timbering items which are done for the protection of the miner. Third is the "Delay Time" item which contains all the delay elements encountered by the face crews during the observation period. And lastly, the "Production Data" section which shows the general data, such as tons loaded per day, tons per man-day, etc., pertaining to the day's operation.

This method of presenting time study results provides all the pertinent information needed by the executive to apply corrective measures to the out-of-line operating practices as found in his particular mine. Naturally if the time study data is just filed away, the face inefficiency goes on. And I contend that many executives rise and fall in direct proportion to rise or fall of the face efficiency operation.

To continue the analysis: Examination of the time study data shows that during the 10-day observation period, these men averaged 768.2 man-minutes or 47.5 per cent of the day in productive work, and 488.5 man-minutes or 30.1 per cent of the day in non-productive work for a total of 1256.7 man-minutes or 77.6 per cent of the total day. Delays amounted to 363.3 man-minutes or 22.4 per cent of the day. During this time the men attained an average production of 2.1 cuts, 82 tons or 27.3 tons per face man-day. On the basis of productive working time only, the average crew loaded coal at the rate of 173 tons per day, or 57.6 tons per face man-day.

### SUMMARY OF TIME STUDIES

**Average of 10 Studies**

**Operation: 3 Facemen—Conveyor Room—Duckbill Loading**

| | Man-Min. | Per Cent | Units | Unit Time |
|---|---|---|---|---|
| *Productive Working Time:* | | | | |
| 1. Shoot coal | 65.4 | 4.0 | 10 | 6.54 |
| 2. Duck coal | 348.3 | 21.5 | 82 | 4.23 |
| 3. Extend panline | 59.5 | 3.7 | 2.1 | 28.39 |
| 4. Prepare to drill | 34.6 | 2.1 | 4 | 8.65 |
| 5. Drill holes | 54.7 | 3.4 | 10 | 5.47 |
| 6. Prepare to sump | 22.1 | 1.4 | 2.1 | 10.51 |
| 7. Sump in | 10.7 | 0.7 | 2.1 | 5.10 |
| 8. Prepare to cut | 10.9 | 0.7 | 2.1 | 5.19 |
| 9. Cut face | 45.6 | 2.8 | 2.1 | 21.72 |
| 10. Pull back and park | 28.4 | 1.8 | 2.1 | 13.50 |
| 11. Change bits | 47.6 | 2.9 | 2.1 | 22.65 |
| 12. Bugdust kerf | 40.4 | 2.5 | 2.1 | 19.25 |
| Total productive working time | 768.2 | 47.5 | | |
| *Non-Productive Working Time:* | | | | |
| 1. Portal travel time in | 135.0 | 8.3 | .. | ..... |
| 2. Portal travel time out | 120.0 | 7.4 | .. | ..... |
| 3. Set up plank | 90.5 | 5.6 | 9 | 10.05 |
| 4. Set and reset roof jacks | 143.0 | 8.8 | 81 | 1.77 |
| Total non-productive working time | 488.5 | 30.1 | | |
| *Delay Time:* | | | | |
| 1. Conveyor stopped | 84.6 | 5.2 | | |
| 2. No power | 3.0 | 0.2 | | |
| 3. Mechanical trouble | 53.6 | 3.3 | | |
| 4. Handle slate | 30.3 | 1.9 | | |
| 5. Wait on cutter | 48.6 | 3.0 | | |
| 6. Wait on clean-up | 28.2 | 1.7 | | |
| 7. Get tools and supplies | 24.2 | 1.5 | | |
| 8. Stand around | 52.0 | 3.2 | | |
| 9. Wait on smoke | 36.8 | 2.3 | | |
| 10. Miscellaneous delays | 2.0 | 0.1 | | |
| Total delay time | 363.3 | 22.4 | | |
| Total time | 1,620.0 | 100.0 | | |

| *Production Data:* | |
|---|---|
| 1. Total cuts loaded | 2.1 |
| 2. Total tons loaded | 82 |
| 3. Tons per face man-day | 27.3 |
| 4. Average size cut | 28′W 7.2′D 4.8′H |
| 5. Total holes drilled and shot | 10—9 |
| 6. Total powder used | 31 |
| 7. Total machine bits used | 68 |
| 8. Total planks set | 9 |
| 9. Total roof jacks set and reset | 81 |
| 10. Sectional men and output | 42 men—350 cars—612 tons |

All the above was obtained while using a popular type standard make shortwall cutting machine. Now let us examine the time study summary and see what would happen at this same mine if we replaced the present bottom cutter with a top cutting shortwall machine thereby improving the roof control conditions at this mine—but for the sake of uniformity leaving all the other items as is—inefficiency and all.

Examination of the working and delay elements of the time study summary shows that item No. 12 "bugdust kerf" amounting to 40.4 man-minutes or 2.5 per cent of the day would be eliminated entirely from the productive work category. In the non-productive category item No. 3 "set-up plank" amounting to 90.5 man-minutes or 5.6 per cent of the day would also be eliminated entirely, and item No. 4 "set and reset roof jacks" amounting to 143.0 man-minutes or 8.8 per cent would be decreased by at least 75 per cent. Furthermore, in the delay category item No. 4 "handle slate" amounting to 30.3 man-minutes or 1.9 per cent of the day would also be eliminated. So that by using top cutters instead of bottom cutters we would gain a total of 268.5 man-minutes or 16.6 per cent of the day that could be utilized in productive work—loading coal. This would raise the daily productivity of the crew from the 82 tons actually loaded to 111 tons per day or 37.0 tons per face man-day. Thus, by simply replacing an outdated unit with another unit designed specifically for that type of work, we increase the productive capacity of the loading unit by 35 per cent.

(*Concluded on page* 73)

# The Grandview Mine

**The Chief Problems in this Washington Zinc Property Have Centered Around a Complex Geology, Affecting Methods of Ore Finding, Development and Production**

THE Grandview Mine, operated by the American Zinc, Lead & Smelting Company, is located about two and one-half miles north of the town of Metaline Falls in northeastern Washington. The town has 500 inhabitants and lies in a picturesque setting on the Pend Oreille river, 110 miles north of Spokane. It can be reached by a good highway or via a branch of the Chicago, Milwaukee, St. Paul and Pacific Railroad.

Although zinc deposits had been known in this area previously, actual development did not begin until 1907 when L. P. Larsen, now president of Pend Oreille Mines & Metals Company, started work on the Pend Oreille property. This mine and the Grandview are the two major operations at the present time with other projects and investigations coming along. American Zinc is also working the Metaline mine, two miles south of the town. This property is owned by the Metaline Mining & Leasing Company in which American Zinc presently has no interest but operates the mine under a management contract. Ore is trucked to the Grandview mill for treatment.

## Area Shows Much Promise

The U. S. Bureau of Mines has done considerable diamond drill exploration in the district, entering upon this work in 1942. A number of geologists of the U. S. Geological Survey have also given the area a good deal of study. Columbia Zinc Company has been working the Cliff and Robert E. Lee claims; a small pilot mill has been set upon the Frisco Standard; and development has been started on the Noisy Creek claims. A large tonnage of ore has been indicated by these various developments so that the district is now generally considered as an area of strong promise in zinc production.

The Grandview mine is leased by American Zinc on a royalty basis from Grandview Mines, Inc., a Washington corporation. Other adjacent properties are either owned or controlled by the zinc company. These will probably become a part of the operation at a later date. American Zinc entered the district in 1933, placing diamond drills on the Bella May claims of Metaline Mining & Leasing Company. In 1937 it took over the Grandview property, remodeled the mill to handle Metaline ore and began diamond drill exploration on the Grandview.

The Grandview property had previously been opened by a long tunnel and some ore had been mined. A 50-ton flotation pilot plant had been built but the property was shut down due to ore exhaustion in 1927. Operations were resumed in 1929 (shut down in 1930) when a 175-ton mill was built. Present mill capacity is 600 tons.

## No Place Undisturbed by Faulting

The zinc-lead ore bodies of the district are replacements occurring generally near the top of the Metaline limestone of Middle Cambrian age. The top 150 feet of this formation is locally considered favorable to ore deposition. Ore is found about 150 feet below the bottom of the overlying Ledbetter slate, a carbonaceous and limey Ordovidian formation, which reaches about 2,500 ft. in thickness in the area. No place in the area is undisturbed by faulting and it is difficult to find suitable markers to correlate the different fault blocks. The ore bodies are limited to the disturbed fault

block* through which the Pend Oreille river flows and are associated with the major faults but are not in them.

Fault slips frequently cut off the mineralization—in other cases the ore simply fades out. Faults are probably a controlling feature yet this control is somewhat difficult to understand. The whole area is cemented and recemented sufficiently however to obviate the use of timber, except for construction of chutes, pockets, etc., in such a broken up formation.

The ores are commonly in jasperoid surrounded by a shell of crystalline dolomite. Beyond this, coarse-grained calcite is found, although this may also be found in solution channels at long distances from ore bodies. Dolomitization occurred regionally prior to the ore introduction. In the Grandview mine, favorable beds are siliceous and are intensely faulted and fractured. Ore bodies are large and of irregular shape. Local dips vary from zero to 20 degrees, thickness varies from mineable height to 100 ft. and this variation may be rather rapid.

Metal values are also irregular with sudden changes common. Current values range from 5 to 7 per cent zinc and 0.5 to 4 per cent lead. Faulting at the Metaline mine is more severe but the ore is generally higher in grade in smaller cross sections, averaging about 8-10 per cent combined zinc and lead.

## Diamond Drill Exploration

Exploration is being continually carried on with diamond drills. Holes are drilled at carefully determined surface locations as well as from favorable underground set-ups. After a rather painstaking size-up of the situation, a drill is set up to drill to some point where indications are favorable to ore body projection. The process is a series of "stepping stones" to gradually extend the known reserves. Underground drills are pointed in those directions which give the strongest indications of ore extension. Sampling is done, and records kept, with meticulous care to give maximum file data on geological information, minerals encountered, assays, group assay averages, etc.—all for easy ready reference.

Surface drilling operations employ two Sullivan Class H D Size 22 drills with Hercules IX B5 engines. A tripod derrick over the drill is 28 ft. high with 38-ft. legs to accommodate 20-ft. drill rods. Drills are company-owned and operated.

In drilling the overburden a chisel bit is used in gravel and a cross bit in sand and clay. Drills must penetrate 80-350 ft. to ledge—a not too easy task in some of the gravelly ground encountered. It is necessary to set a 3-in. casing at ledge in order to accommodate the following diamond drill. Casing is driven with a 700-pound drive hammer.

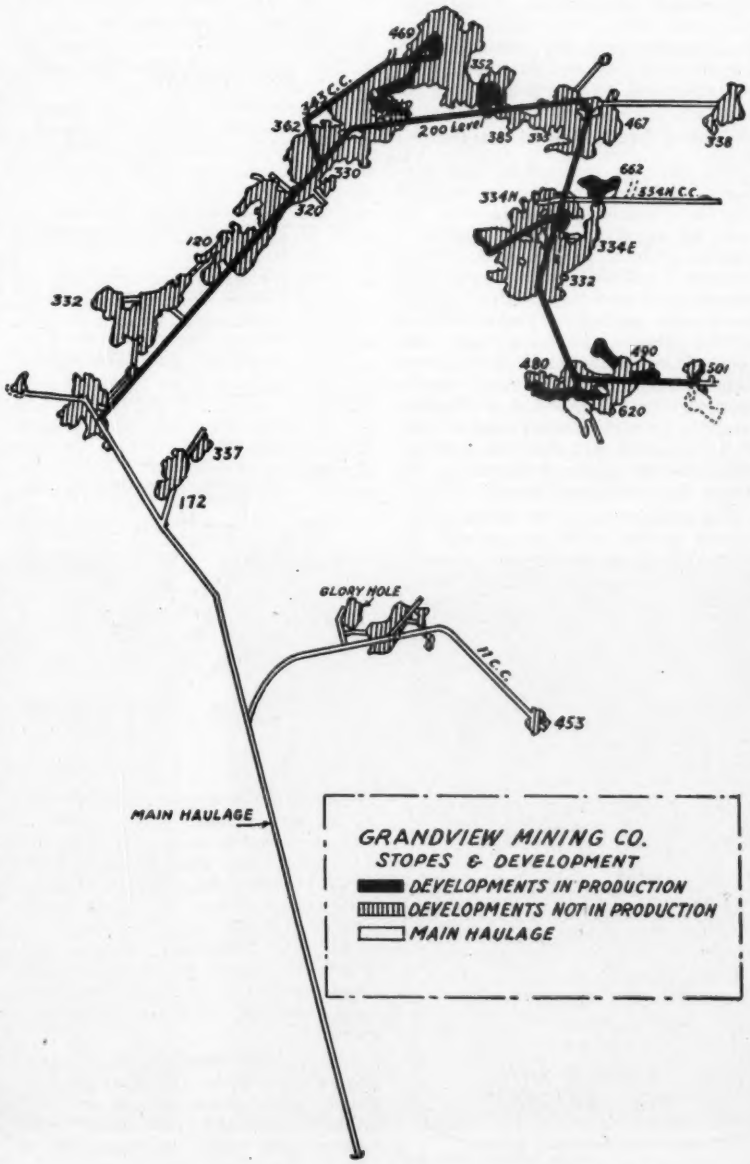
A 5-ft. swivel-tube EXH core barrel is employed in the diamond drilling. Diamonds are put on at ledge to drill a 1 7/16-in. hole. Bits are set with 24 diamonds by the J. E. Havlick Company in Spokane. Havlick also makes the core barrels used.

These core barrels are of two different types. In the rare completely cemented ground a core-lifter is used. In the normal broken ground the drill must be pulled whenever it blocks. In such ground no core-lifter is employed. Average core pull is about 2½ ft.

Underground exploration is done with two C. P. 5 diamond drills employing equipment of the same size as the surface drills.

## Previous Development Was Extensive

When American Zinc took over the Grandview, a large haulage tunnel had already been driven. This opening is 10 ft. by 10 ft. in cross-section. It is equipped with 36-inch gage track of 40-pound rail laid on 6-ft. tamarack ties (cut locally). A 10-ton Westinghouse trolley-type locomotive hauls 6-ton Sanford-Day bottom dump cars over this road from the top of an incline inside to the crude ore bin just




* Park, C. F., Jr., "Dolomite and Jasperoid in the Metaline District, Northeastern Washington." Econ. Geol., Vol. 33, Nov., 1938, p. 709.

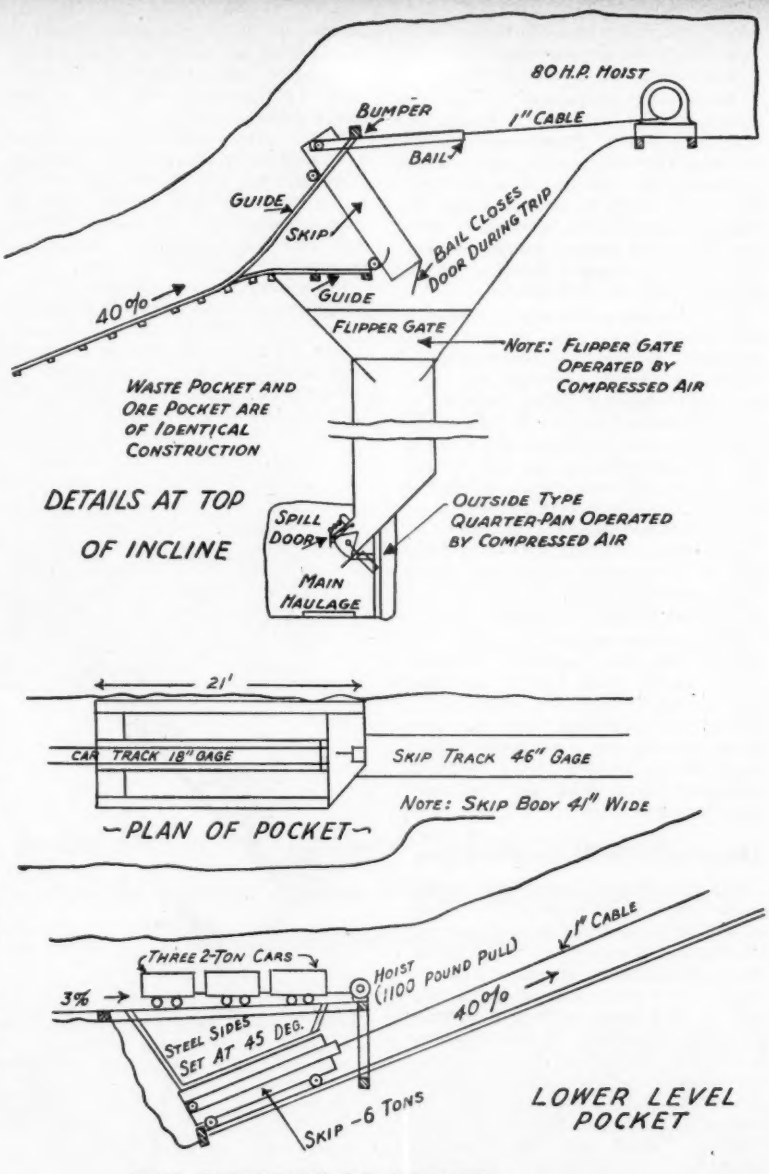
outside the portal. The haulage grade is level for a portion of the distance and the balance is at ½ per cent in favor of the loads. This heavy installation was made by the previous operator in anticipation of large production. The tunnel is untimbered (except near the portal) as the ground stands exceptionally well.

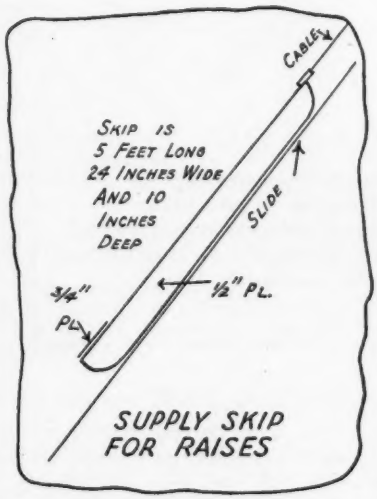
An incline commencing at a point 1,900 ft. inside the portal has been driven down to the level of the ore horizons. This incline is 650 ft. long on a 40 per cent gradient. Its purpose is to transfer the ore from the lower level pocket to a storage pocket above the main haulage tunnel. Equipment includes a 46-in. gage 40-pound track, a 6-ton special skip (built by Union Iron Works and designed by American Zinc engineers), an 80-horsepower single-drum geared electric hoist with 1 in. hoist cable, a dumping device at top, pocket-changing device at top and dumping facilities at bottom. (See sketches).

## Novel Features at Incline

The skip was designed for dual purposes—sinking, and for permanent use as a means of hauling ore. Its open top made it easily adaptable to loading from a scraper slide during sinking. This slide was equipped with an air hoist and was chained to the track with eye-bolts. Pocket loading of the skip is also simplified. The pocket is virtually an open funnel over which a string of three 2-ton cars is spotted, thus filling the skip with one "spot." An air-operated tugger, with an 1,100-pound pull does the spotting while the locomotive returns to the stopes for additional loads.

The skip dumps as the forward end follows special inside guides and the rear end is elevated (see sketch). When moving up and down the slope, the skip door is held closed by means of the bail. A flipper gate, operated by an air cylinder, may be used to change direction of skip contents into a different chute when handling waste rock. For the purposes of handling rock and ore above the main tunnel and dumping it into cars, two large pockets of identical design with quarter-pan gates are installed. The gates are air-operated and are equipped with chain-suspended spill doors.




Lower level haulage from stope-chutes to pocket is over 18-in. gage 30-pound track. Cars in use are both gable-bottom and side-dump types (either type easily accommodated at pocket) and are hauled by a 5-ton trolley locomotive. Haulageways on this level are 6½ ft. by 7½ ft. and give 7 ft. trolley clearance. All of the electric trolley haulage using 250 volt D.C. auxiliary hauling is handled by a 6-ton Mancha storage battery locomotive—for special spots where trolley is not installed.

## Operating the Open Stopes

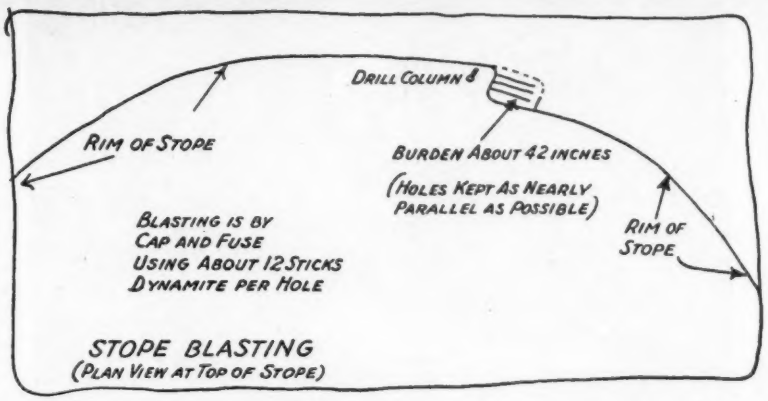
Mining is by open stope methods. As previously stated these stopes are irregular in shape and of various sizes. Stopes are started from raises driven at 55 degrees. At the selected spot, side swiping is commenced and

the stope gradually enlarged. Every attempt is made to start at the top of the ore and work down in steps. If initial contact proves to be below the top, advance is made upward until the top is reached. This may be accomplished by a short raise or small shrinkage stope. Experimentally, stopes have been started at a more central elevation which has some definite advantages but one of the difficulties arising is development of too much blocky ore with overhead breakage. This is now being worked out. Nearby diamond drill holes are commonly helpful in this situation but it is noted that mineral conditions may vary widely within a distance of 50 ft.

As stoping progresses, faces are inspected by the foreman and marked for drilling. Ore is taken in terms of mill feed requirements and in such a way as to avoid glutting any one place at a time. A "side-cut" is used at the upper rim of the stope (see sketch). Holes are drilled from a column set up. Drill column is 3½ in. in diameter with side arm. Three positions are used to drill this side-swipe round. Drilling is wet, with detachable bits. Ingersoll Rand drifters are used with 1R jackbits. Air pressure furnished is 95-105 pounds. Bits are reconditioned by a special process developed by the mine master mechanic, Roy Gilbert. The method is described below in the discussion on shop facilities.

## Drill Rounds Designed to Yield Most Ore

Holes are drilled 8 to 11 ft. deep in the side-swipe rounds after the "cutting-in" round has been blasted. One cutting-in round is necessary for each series around the stope rim. Holes in the side cuts are loaded with 12 sticks per hole of No. 2 mine gelatin (45 per cent strength by volume). Blasts are set off by cap and fuse and produce about 30 tons of ore per round.


DRILL COLUMN &
RIM OF STOPE
BURDEN ABOUT 42 INCHES
(HOLES KEPT AS NEARLY PARALLEL AS POSSIBLE)
RIM OF STOPE
BLASTING IS BY CAP AND FUSE USING ABOUT 12 STICKS DYNAMITE PER HOLE
STOPE BLASTING
(PLAN VIEW AT TOP OF STOPE)

Bench rounds are drilled from tripod set-ups. Drills are model D. A. 35 with power feed and use detachable bits, drilling to 9-13 ft. depths. Starters are 2⅛ in. with ⅛ in. changes. Changes are made on the 30-in. run-out of the drill carriage if possible, although sometimes the hard drilling imposes a change for every 6 in. Regularly, Columbia (Western Cartridge Co.) 45 per cent volume strength dynamite is used. Sticks are 1⅛ in. by 8 in. Some experimenting is going on with regard to selection of proper explosive for this bench blasting. The desired end-result is proper fragmentation. Currently being tried are: 60 per cent special gelatin; 80 per cent special gelatin and mine gelatin No. 1.

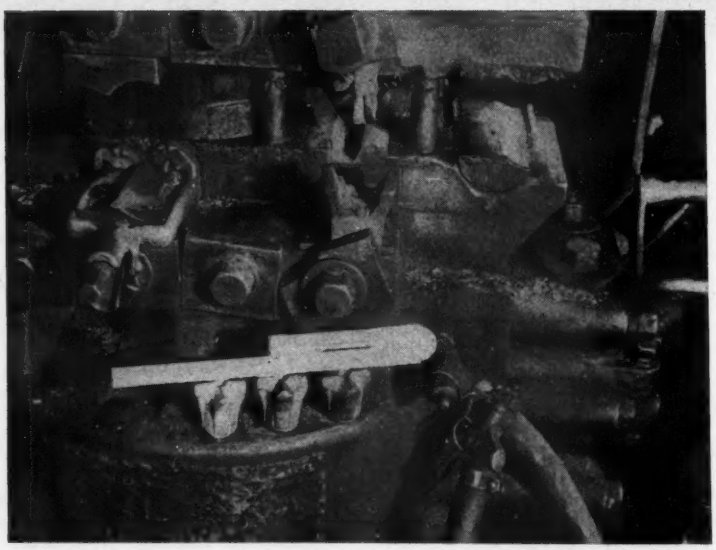
In raise blasting, 40 per cent special gelatin is used—its plasticity is desirable for the up-holes. Mine headings being driven in the footwall are being blasted with (Columbia) CLX-104, 35 per cent. Stoper drills are used on raises as well as on some stope trimming.

## Movement of Ore and Supplies

Stope raises are two compartment 5 x 10 ft. in cross-section, driven on a 55 degree slope. The man-way half of the raise includes a planked supply slide 42 in. wide which accommodates a small supply skip for drill steel, etc. Its design is shown in a sketch herewith. It is hoisted by a small air-hoist at the top of the raise. These tuggers have an 1100-pound pull.

Diamond drill set-up

Portion of surface plant



Left—Jackbits before upsetting

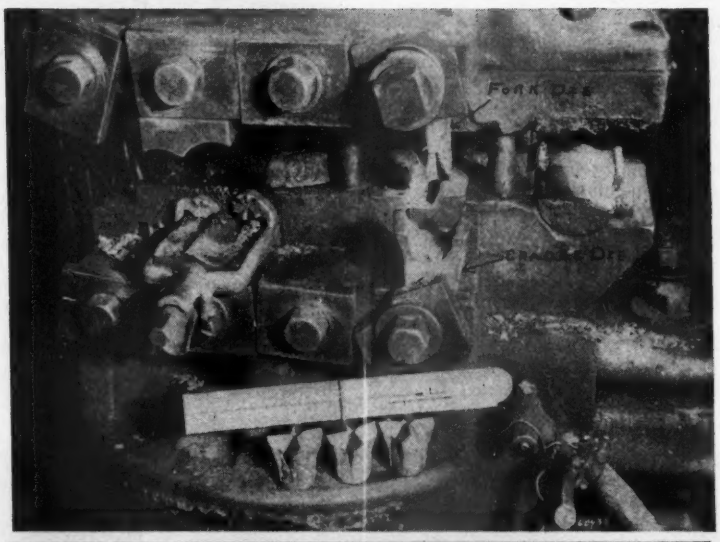
Below—Bits are upset on special device as shown

Bottom—Careful tempering guarantees good bit performance

Ore movement in the stopes is handled by a Sullivan 15 horsepower double-drum electric hoist mounted on skids. This handles a 36-48-in. hoe type scraper fitted with manganese steel wearing plates. Steel rails at 18-in. centers are laid over the raises as Grizzlies to protect against putting too large chunks into the ore flow.

Flood lights in stopes are of the street light type with large reflectors and 200 watt bulbs. They are set up on steel tripods. Ventilation in stopes and dead ends is by means of T-8 Coppus blowers through 18-in. metal tubing, pumping air *into* the stopes. A raise to surface from the main haulage tunnel provides an auxiliary escapeway and space for the 6-in. air line and ventilation. Ventilation for the most part is by natural means.

At the portal, facilities are set up for change room, office, powder preparation, blacksmith shop and general repairs, and air compressor room. Compressed air is furnished at 95-105 pounds pressure by Sullivan angle compound compressors driven by a 200 horsepower General Electric synchronous motor. Additional air is furnished by Sullivan angle compound compressor with a 100 horsepower G. E. motor.



## Novel Method of Reconditioning Bits

Detachable bit work is all done at the Metaline shop. The four-point jackbits are reconditioned by a die-forging process developed at the mine. Lost gage is restored to the end that a bit may be used at the same gage at least twice. In chert and limestone fully eight uses per bit is considered feasible.

Herewith is Mr. Gilbert's description of his process:

"Underground drilling at Grandview Mine is done by the use of Sibley style Ingersoll Rand jackbits with starting size of 2⅛ in. with ⅛ in. decrease in gage for each 2 ft. change of steel. Wet grinding was first used to recondition bits but due to very abrasive formation of grey chert and limestone we had excessive gage loss.

"The process now in use restores lost gage and was worked out and patented by F. Fillerup, R. Calhoun and R. B. Gilbert. The tools for this work consist of two dies, one known as a cradle die and the other as a fork die. They are used in the IR50 sharpener as shown in photo No. 2 with fork die above the cradle die below.

"Bits are heated in an open furnace to 1650 degrees, are taken from furnace and handled by a piece of 1 in. tubing 12 in. long placed in the cradle die; head of machine is lowered and fork die presses wing of bit outward to original size, each wing being spread 1/16 in. The cutting edge is then put on the bit while hot by a few strokes of the J5 bit grinder.

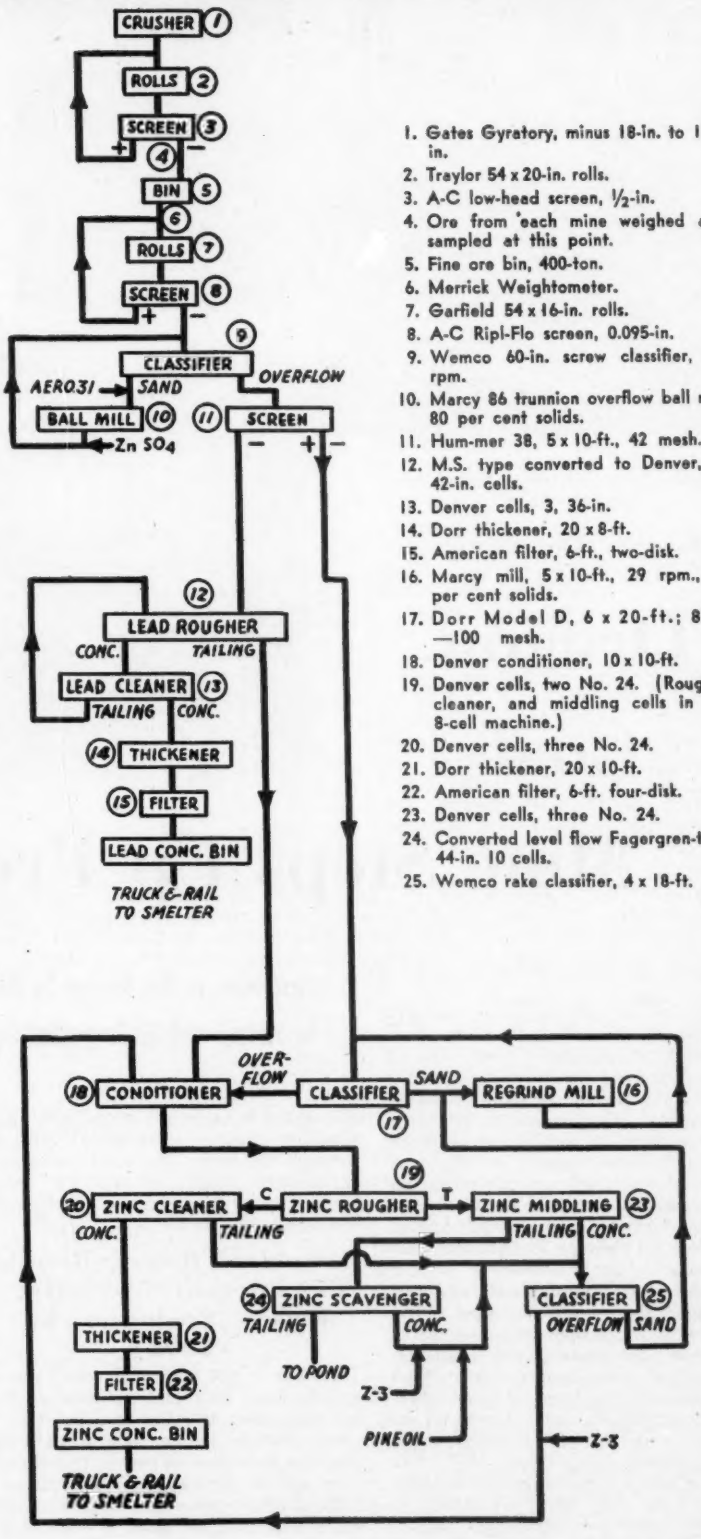
"Gaging blocks on sharpener are used to gage each bit. Bits are used two and sometimes three times at each size before being gaged down to next size. This continues until bits are completely worn out both in length and gage. Bits are retempered as shown in picture No. 3 with shop made tempering tank, bits at 1400 degrees using water at 90 degrees. Bits are reconditioned seven times, giving eight uses per bit. Picture No. 1 shows bits before sharpening, picture No. 2 shows same bits after sharpening. Two men can recondition and retemper about 500 bits per eight-hour day.

"This process is proving very satisfactory and is being used at both Grandview and Metaline mines."

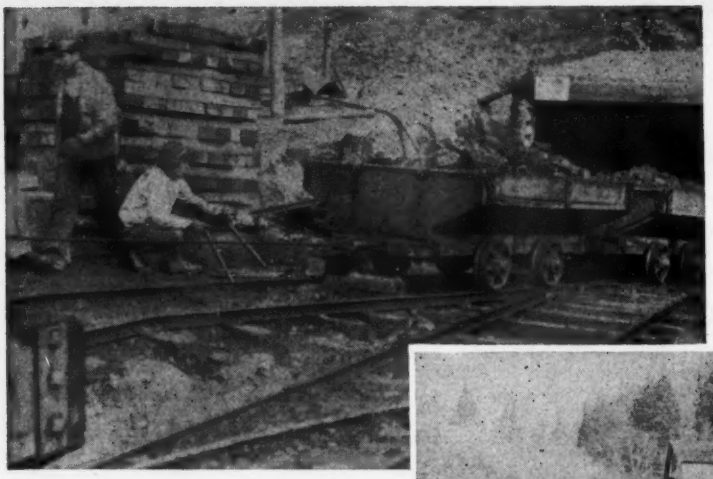
## Ores Combined with Metaline Ores for Treatment

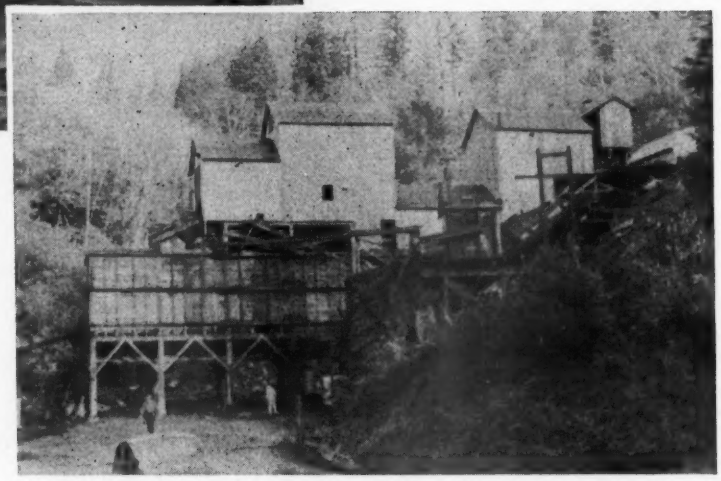
Ore is recieved at the Grandview coarse ore bin from the bottom-dump cars. Since ores to go through the mill are also received from the Metaline mine, a separate bin is arranged. Ores from the two mines are crushed, sampled and weighed separately and then combined in a 400-ton storage bin.

The crushing unit can handle 60 tons per hour. Mine run ore goes to a Gates 8K gyratory, thence to a set of 54 x 20-in. rolls in closed circuit with a 4 x 10-ft. Low Head vibrating screen. Circulating load is 100 per cent and the screen is adjusted to give a ½-in. product. After automatic weighing and sampling, the ore goes to the fine ore bin (400-ton capacity) where it is combined with the Metaline mine ore.




1. Gates Gyratory, minus 18-in. to 1½-in.
2. Traylor 54 x 20-in. rolls.
3. A-C low-head screen, ½-in.
4. Ore from each mine weighed and sampled at this point.
5. Fine ore bin, 400-ton.
6. Merrick Weightometer.
7. Garfield 54 x 16-in. rolls.
8. A-C Ripl-Flo screen, 0.095-in.
9. Wemco 60-in. screw classifier, 8.5 rpm.
10. Marcy 86 trunnion overflow ball mill, 80 per cent solids.
11. Hum-mer 38, 5 x 10-ft., 42 mesh.
12. M.S. type converted to Denver, 10 42-in. cells.
13. Denver cells, 3, 36-in.
14. Dorr thickener, 20 x 8-ft.
15. American filter, 6-ft., two-disk.
16. Marcy mill, 5 x 10-ft., 29 rpm., 77 per cent solids.
17. Dorr Model D, 6 x 20-ft.; 80% —100 mesh.
18. Denver conditioner, 10 x 10-ft.
19. Denver cells, two No. 24. (Rougher, cleaner, and middling cells in one 8-cell machine.)
20. Denver cells, three No. 24.
21. Dorr thickener, 20 x 10-ft.
22. American filter, 6-ft. four-disk.
23. Denver cells, three No. 24.
24. Converted level flow Fagergren-type, 44-in. 10 cells.
25. Wemco rake classifier, 4 x 18-ft.





Above—Spragging trip of loaded cars coming up slope

Right—View of Southport washery

★

By RALPH S. MASON

Engineer
Oregon State Department of Geology and Mineral Industries

★

# Oregon Coal Mine Steps Up Production

## First Mine in the Region to Become Completely Mechanized Both in Surface and Underground Operations. Has Good Local Market

THE Southport coal mine, operated by the Coast Fuel Corporation, is located five miles south of the city of Coos Bay, formerly Marshfield, which borders the bay of the same name on the southern Oregon coast. The area is served by a branch of the Southern Pacific Railroad and U. S. Highway 101, both of which are about half a mile from the mine. It would also be possible for ocean-going vessels to load at a dock on Isthmus Slough, less than half a mile from the mine.

Although coal mining has been carried on in this region for many years, the Southport is the first mine to be completely mechanized both in its surface plant and underground. Fuel shortages arising from increased wartime consumption, coupled with an increased local demand brought about by a shortage of wood fuels, make this mine of prime importance at this time.

The Coos Bay field lies within a roughly elliptical structural basin, measuring 35 miles north and south by 11 miles east and west. Topographic relief is moderate, with numerous streams cutting steep-sided valleys through the hills. The area has been extensively logged off and is now largely covered with dense brush and second-growth timber.

### Historical Record Reveals Considerable Activity; Highest Production in 1904

Mining in the coal field which surrounds Coos Bay and extends south for more than 30 miles to a point beyond Coquille began soon after the region was settled in the early 1850's. Coal was discovered near Empire in 1854, and the mines just southwest of Marshfield first operated in 1855. By 1880, when records were first kept, production was about 40,000 tons a year, and for 15 years annual production ranged between 30,000 and 75,000 tons. In 1896 and 1897 the production mostly from the Eastport and Newport mines exceeded 100,000 tons a year, a figure not reached again until 1904, the year of maximum production, when 111,540 tons of coal was shipped. The coal was often loaded for shipment to the San Francisco Bay region on coastwise steamers which came far up the sloughs, in some cases almost to the mine portals. Since 1905 there has been a general decrease in production, attributable in part to the decline of the California market, and because in the 1920's oil began to replace coal in railroad operation and in domestic heating. From 1903 to 1920, at least half the total production came from the Beaver Hill mine, which was owned and operated by the Southern

Pacific Company. When it closed down in 1923, it had reached a depth of 1,400 ft. below sea level and a distance of 3,030 ft. down the dip of the coal. Since that time, coal has been produced largely for local consumption at a rate varying from 7,000 to 15,000 tons a year. The recorded production of the Coos Bay field from 1880 to 1920 was 2,380,000 tons. Probably the total production is in the order of 3,000,000 tons.

## Characteristics of the Coal and Disposition of Beds

The coals are of Eocene age and subbituminous in rank. None of the coals has coking properties. The Coos Bay coals are characterized by a relatively high moisture content, a moderate percentage of ash, low sulfur content, and a heating value of 9,260 to 10,080 b.t.u. per pound, as received.

All of the coals have low friability indices, thus indicating that they will withstand well the forces of impact and attrition that produce breakage and degradation in size during handling.

Slacking tests showed that all of the coals will weather or slack to some extent when exposed to the elements after mining. Most of the coals are classed as strongly slacking and therefore will not withstand storage during dry weather unless oxidation and loss of moisture can be prevented.

The thickness of the coal beds in the Coos Bay area ranges from less than an inch to more than 19 ft., but only the Beaver Hill and Riverton beds have been extensively mined. The Beaver Hill bed has a fairly uniform thickness over an outcrop distance of about seven miles from the Southport on the north to the Klondike mine on the south. The thickness of mineable coal is rarely less than 4 ft. and usually is more than 5 ft. In the Newport basin, the thickness was usually over 5 ft. in the Libby, Eastport, and Englewood mines. The Riverton bed averages between 3 and 4 ft. in thickness.

The attitude of the coal beds in the Coos Bay field varies widely. Horizontal or gently dipping beds are present in the Libby, Englewood, Eastport, and South Marshfield mines; dips of 8 degrees to 15 degrees are present in the Southport and Smith-Kay mines; 15 degrees to 30 degrees in the Alpine and Thomas mines; and 30 degrees to 45 degrees in the Delmar, Overland, Martin, Beaver Hill, and Klondike mines.

## Investigations Reveal Extent of Deposits

The first detailed survey of the coals in the Coos Bay field was made in 1896 for the U. S. Geological Survey by J. S. Diller. The survey was continued and the results were published in 1899, 1901, and 1911.

A geologic study of the Coos Bay quadrangle, with particular emphasis on the coal resources of the Coos Bay field was made by the State of Oregon Department of Geology and Mineral Industries from April, 1943 to April, 1944. J. E. Allen and E. M. Baldwin, department geologists, collaborated on the geological work.

During the detailed examination of the selected projects, areas totaling 980 acres were mapped on a scale of 200 ft. to the inch with a 10-ft. contour interval. A total of nearly 9,000 ft. in 322 holes was drilled by hand and power drill. Coal was faced, measured, and sampled in 107 places, and coal outcrops on the eight projects were traced by shallow drilling and open cuts for a distance of 18,500 ft.

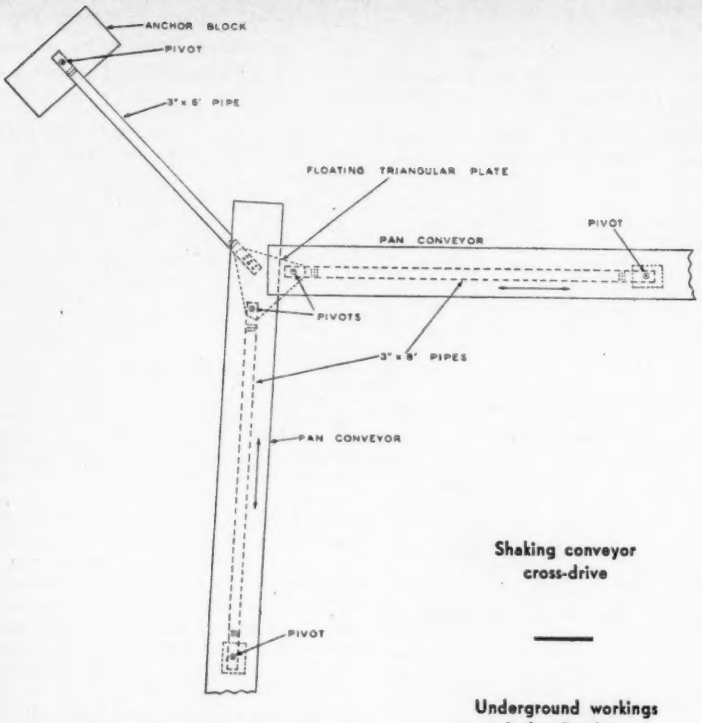
## Southport Mine is Only Operator Producing More Than a Few Tons Per Day

Of all the mines in the Coos Bay field which have been in operation at one time or another, only half a dozen are at all active today and only one of these, the Southport mine, is producing more than a few tons per day. The other small operations are conducted entirely by hand, have intermittent production, and make little or no attempt to either size or wash their product.

The Southport mine was first opened up in 1875 and subsequently extended some 2,000 ft. through the hill. About 55 acres of coal have been mined from the property with a production of about 250,000 tons. For several years the mine maintained a fairly large production, most of which was sent to San Francisco by water. In June, 1944, the Coast Fuel Corporation leased the mine, which is owned by the Southport Land and Commercial Company of San Francisco and deepened a new slope which had been started a year before. The Southport portal is located near the foot of a fairly steep hillside about 75 ft. above tidewater on a branch of Isthmus Slough. The coal dips about 7 degrees but has local variations. The coal bed is 56 in. thick with a parting in the middle 6 to 10 in. in width. Roof and floor are of sandstone. The coal mined at present has 9,780 b.t.u.'s, 8.6 per cent ash, 13.4 per cent moisture on an "as received" basis, and an ash fusion temperature of 2150 degrees F. On a dry basis the coal has 11,800 b.t.u.'s.

## Current Production from Headings Only

The present operation is adjacent to and down the dip from the former workings which have been abandoned. A 490-ft. slope on a 5 degree angle was sunk on the seam, and a double entry was turned off 45 ft. from the bottom. There is approximately 300 ft. of coal between the upper gangway and the lower limits of the old working above. The mine is currently operating two shifts a day, six days a week. Shifts are eight hours — portal to portal. The mine crew on the day shift consists of five men to a face, plus one haulage man, two track men, and two timber men. On the night shift there are at present 4 men to a face, plus one haulage man and one timber man. Only development is being done and no rooms are being turned until the two entries have been driven to the property line, about 1,250 ft. from the present face which is now 1,200 ft. from the bottom of the slope. The lower entry is 16 ft.



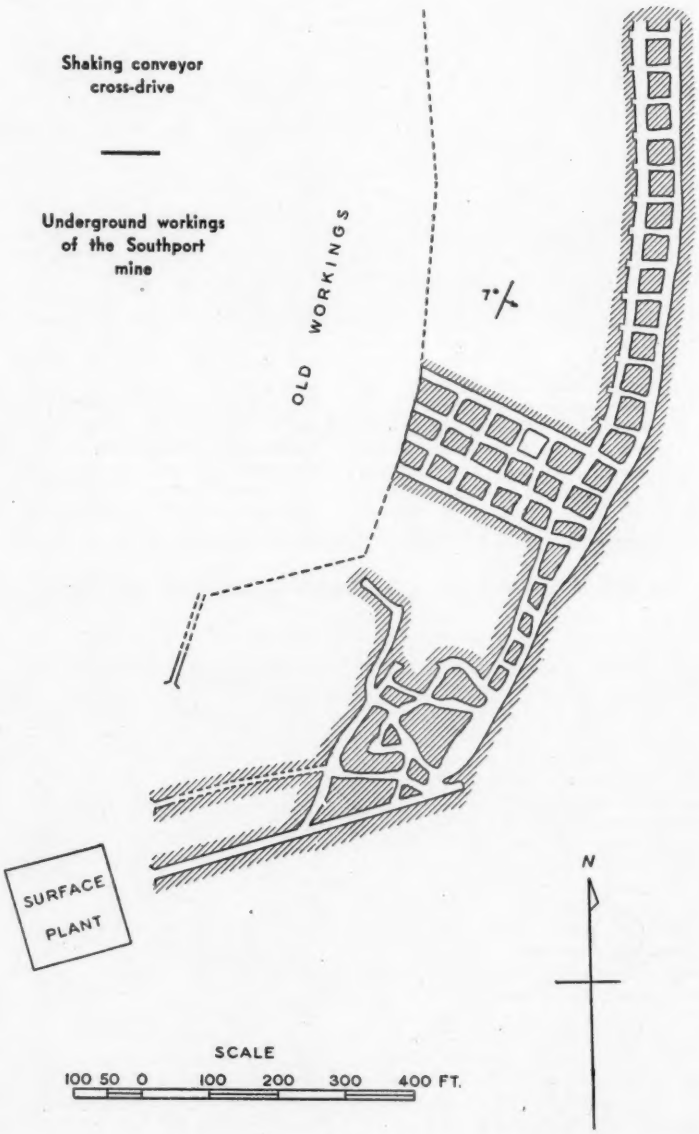

wide and the upper 20 ft. wide. Current production of coal from the two headings is 200 tons per day. The coal will be mined by the room and pillar system with 300-ft. rooms, 36 ft. wide and with a 30-ft. rib.

## Mechanical Equipment in Use

Two Goodman coal cutters, one with a 6½-ft. bar, the other with an 8-ft. bar, are used to undercut the seam. Both cutters are powered by 50 horsepower 440 volt A.C. motors. Each heading is drilled with three 1¼-in. holes, which are 6 in. shorter than the undercut, and loaded with three sticks of either duPont CC lump or Monobel AAA. Rotary electric drills fitted with regular coal augers are used for drilling. The round is fired electrically using instant primers and a hand-held magneto. Thirty-six tons of coal are produced per round and are transported to cars by means of chain-supported shaking conveyors driven by 25 horsepower motors. Conveyor lines are kept as short as possible. The line from the upper entry passes through a crosscut near the face and discharges with the lower pan line into the cars.

A novel cross-drive for the pan conveyor was designed and built at the mine when the conventional unit failed to give satisfactory performance on the turn from the upper entry. This new unit consists of three sections of 3-in. pipe, two of them 8 ft. long and the other 6 ft. long. One end of each of the 8-ft. pipes is connected to the bottom of the two sections of the pan conveyor with pivots; the other ends are pivoted to the corners of a triangular plate. One end of the 6-ft. pipe is attached rigidly to this plate, while the other turns on a pivot anchored on the floor.

Chain suspension of the pan lines was installed when rollers caused trouble. The loading pan at the face is moved by a rope from the drum of the coal cutter and is handled by four miners and the machine man. Wooden end-dump coal cars with a capacity of 2½ tons each were constructed locally. Four cars constitute a trip and can be loaded in five minutes when both conveyors are working. The cars are



spotted by hand after delivery by a two-ton electric locomotive made locally by the combined efforts of the Hansen and Whitney Electric Company and the Neish Machine Shop of Coos Bay. It is the first electric mine locomotive in the area and is powered by a 7½ horsepower D. C. motor equipped with a V-belt drive. The two axles are connected by chain drive. The unit is equipped with 19-inch wheels, and has a speed of 600 ft. per minute. A 25 horsepower motor-generator unit supplies current to an overhead trolley wire. The locomotive hauls cars between the face and the siding at the foot of the slope where they are connected to the hoist rope.

The hoist on surface has a 30-in. diameter drum, chain-driven by a 50 horsepower electric motor. A ¾-in. wire rope serves as a hoisting cable. One and one-half minutes are required to hoist a trip of four cars to the surface where they are each spragged and then pushed separately by hand to the surge bin.

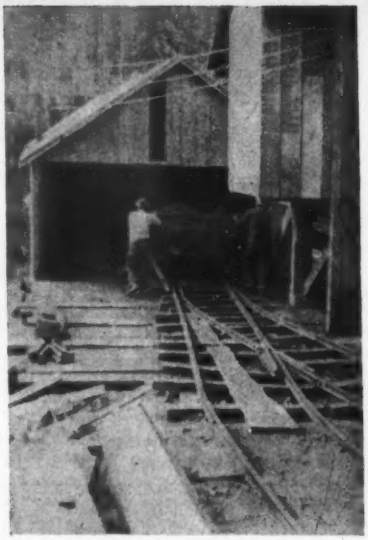
## Drainage, Ventilation and Roof Problems

The entries are run on a 1 per cent grade for drainage but so far little water has been encountered. Drainage of the mine is accomplished by collecting the small amount of mine water in a 100-ft. sump at the foot of the slope and pumping it to the washery at the plant with two 2-in. centrifugal electrically driven pumps. Ventilation for the entries and headings is provided by a 36-inch Austin exhaust fan which is supplemented by two 12-inch Austin booster fans located near the faces. Twelve-in. metal pipe is used to convey the air along the entries. As the work progresses, this present ventilation equipment will become inadequate and an 8-ft. Air-Vane fan has been ordered. A recent test for gas at the face, by the U. S. Bureau of Mines, revealed that there is practically none present. Lighting along the entries is with regular electrical fixtures; the crew uses M.S.A. cap lamps.

Timbering is required in the entries and both split and round Douglas fir posts, obtained locally, and set on 6-ft. centers, are used. The roof is uniformly strong and even, and causes little trouble. The floor tends to roll slightly and light jackhammers are used to level it for the track. The track has been built with 30-pound rail in the past but 45-pound rail will be used in the future, since the 30-pound weight is now unobtainable.

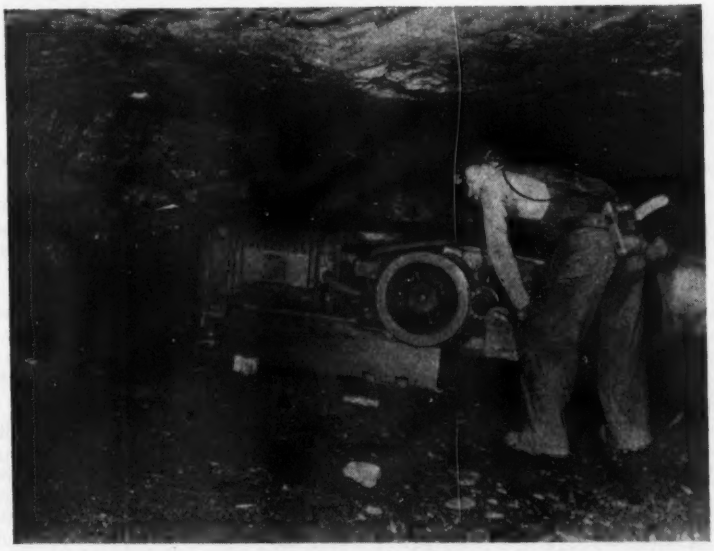
## Coal Preparation Facilities

The washery has a capacity of over 40 tons of raw coal an hour. Coal from the surge bin passes over a 30-inch link-belt reciprocating pan feeder with a 2⅜ in. punched plate deck. The undersize goes to a bin, feeding into a 12-in. link-belt bucket conveyor which elevates the coal to a 60-in. link-belt jig with a 3-in. stroke and a 3/16-in. screen. The oversize from the pan feeder passes over a 36-in. link-belt picking table. Lump coal is either transferred to a 50-ton storage bin or broken in a Jeffries 24 x 36 in. single roll and delivered to the same bin which feeds into the boot of the bucket elevator handling the undersize material from the pan feeder. All of the jigged coal passes over a double deck vibrating link-belt screen which makes three products—nut, stoker, and buckwheat—which are delivered to 50-ton bins. A 15-inch dewatering drag is installed to permit recirculation of the jig water to the washery tank. Rock and waste are also delivered to a bunker and hauled away by truck for road ballast. A 6-ton Reo dump-truck is used to transport the coal to the rail siding 9/10 mile distant.



Dumping 2½-ton car

All local deliveries are made either by local dealers operating their own trucks and picking the coal up at the washery bunkers, or by contract haulers who deliver coal as far away as 95 miles to some towns and government institutions. The washery crew numbers four on the day and night shifts and consists of one hoist man, one spragger, one picking table operator, and one washery man. A blacksmith, electrician, trucker, and trucker's helper complete the crew. The surface buildings consist of an office-warehouse, a dry room and change house, a blacksmith and welding shop, a compressor house, and the fully enclosed washery. Compressed air is furnished by a 284 cu. ft. Worthington air-cooled compressor, powered by a 50 horsepower electric motor. Welding repairs to both surface plant and the mine are made with a 200 amp. 440 volt, 3-phase Lincoln electric arc welder mounted on a mine car chassis.



Undercutting 56-in. seam

## Markets

The bulk of the coal being produced presently is shipped to several government institutions. The largest order is one of 27,000 tons for the Klamath Falls Veterans Marine Hospital; 6,000 tons is also being delivered to the North Ben Naval Air Base; 3,000 tons to the Roseburg Veterans Hospital; and 2,500 tons to the Army's Camp White, Medford.

Prior to the installation of the present Southport washery, local consumption of Coos Bay coals was limited. This was in part due to the

(*Concluded on page* 73)

Nevada's leading mercury producer—the Cordero mine

★

By WORTHEN BRADLEY
President
Bradley Mining Company

★

# Mercury Meanderings—*Part I*

## Timely Comment on the Current Situation in Quicksilver Mining Covering Operating and Economic Problems

THE MEANING of the above title will become clearer as digressions are made from subject to subject; or as, perhaps I should say, the article itself becomes more and more unclear.

At the time this is being written (October and November, 1945) domestic quicksilver production is down to about 1,000 flasks per month. This is less than one-third of our production rate of earlier this year, and less than one-fifth of the rate of peak wartime output (which occurred in the fall of 1943, just before the War Production Board "pulled the plug" on the industry).

### Cause of the Mercury Surplus

What's the reason for the fix we're in? Well, the immediate cause is the end of the war with its resultant cancellation of the battery program, and its attendant surplus of thousands of flasks of metal, mostly of Spanish origin. Nearly every branch of our Government, from the State Department down, has been blamed for this. But I think it all dates back to the original mistake, made in the peak period referred to above, the fall of 1943.

At that time the mercury battery had recently been invented, and its development was in the hands of the Signal Corps of the U. S. Army. The War Production Board (peace to its soul) was aware that there was something of this nature in the wind, but had no detailed knowledge of it. So at the advisory committee meeting in October, 1943, the WPB told the assembled producers that there was too much quicksilver and that they had better cut back their production at least 30 per cent. It was not too subtly hinted that complete shutdowns would be even more desirable.

New development tunnel at Hermes mine

### Rapid Ups and Downs Have Serious Effect

In 1944 the producers, hastened by a declining market during the first half of the year, cut back and shut down until by November production was only 2,300 flasks (down 56 per cent from the 1943 peak). But in the meantime, around mid-year the appetite of the growing mercury battery plants began to be felt. By the end of 1944 consumption was up to 3,900 flasks per month (officially reported, but not necessarily the complete total), as against the low of 3,000 flasks achieved earlier in the year. By May of 1945 the monthly consumption was 8,900 flasks, a peak which would probably have been surpassed, had the war continued beyond August.

But by August, 1945, the harm had been done to our industry. To narrow the alarming spread between production and consumption, thousands of flasks of quicksilver had poured in from Spain. Then the war ended and —well, this is where we came in.

### U. S. Production Could Have Met Demands

The following observation is admittedly hindsight, but is worth making: If the domestic mines had been allowed to continue producing at the 5,000-flask-per-month rate, a substantial surplus (over consumption) would have been built up by mid-'44. The

mines could not have carried this unsold metal, but if the Government had stockpiled it and then fed it back into the battery development, there would have been no necessity of stirring up the Spanish pot. It is conceded that quicksilver from elsewhere in the Western Hemisphere might have, with some justification, been considered a necessary adjunct. But the way it looks now, U. S. production alone could have covered our requirements.

In this event, what would have happened after V-J Day? It would have been necessary for the producers to cut quickly from 5,000 to 3,000 flasks per month, instead of from 3,000 to approximately 1,000, as they have done. The 5,000-to-3,000 cut would have been accompanied by some hardship and dislocation, it is true; but to a far less degree than has already been the case. And the reason for it would have been crystal clear to everyone concerned.

So to sum up, lack of liaison between two Government agencies (the Signal Corps and the WPB) dealt an important domestic industry a blow from which it is still attempting to recover. I believe the whole thing is as simple, and as shameful, as that.

## Mines Now Largely Idle

Well, enough of what might have been. To return to the more or less factual, what are the mines doing at present? As intimated above, not much. Following the decline of the market in August and September there have been so many shutdowns that the only important continuing operations are the Cordero (which was down for most of September and October) in Nevada; the Sonoma, Abbott, New Almaden, Guadalupe, and Buena Vista in California; and the Bonanza in Oregon. Even some of these properties are on an intermittently continuous basis, if such a contradiction in terms is possible. They start up and run as long as their labor and ore supplies permit.

## Typical Intermittent Operation

The Bonanza Mines, Inc.'s, Hermes Mine in Idaho was treating low-grade dump ore in one kiln and was starting a low level development adit, when I visited there in August, 1945. The portal of this adit is below the plant at the 7,500 level, which in turn is 100 ft. below the main haulage level.

It was hoped that this adit would require little timbering, at least until the wet, heavy ore zone was encountered beyond the quartzite. Basing estimates on work done above the 7,600 level, and upon diamond drill cores, the ore zone would have been hit in 650 ft. and would be 150 ft. wide. The Hermes was second in U. S. production in 1943, and seventh in 1944.

Last minute news sources tell us that the Hermes adit is being continued, but that furnacing of dumps has been stopped; and that the New Almaden operation was terminated in December, 1945.

The Red Devil Mine in Alaska has shut down, expecting to resume operations in the spring. There seems to be no important present activity in Texas, Arizona, Arkansas, or Colorado.

## Optimism Prevails However

As a contrast to the doleful tone of much of this article so far, it must be admitted that quicksilver producers are incurably optimistic. All the larger companies have been taking care of necessary maintenance work, and several have even been able to accomplish some development. A few properties (including Reed—second placer in 1941—and Mt. Diablo) are either resuming, or about to resume operations at this writing.

View of New Idria plant and camp

First place in 1945 production will go to New Idria by a wide margin as usual, in spite of that property being shut down for part of the year. Second place should be achieved by Cordero (which in mid-'45 was producing 500 flasks per month) or Sonoma.

It is no longer news that New Idria and Cordero have found magnificent ore bodies by intelligently planned and executed development campaigns. New Idria already had ore but its recent discoveries, stimulated by isometric plotting of the ground, added years of life to this remarkable old mine.

## Cinnabar at Depth at Cordero

Cordero was in a different situation. It was about ready to close up shop when its management decided on a campaign of churn drill prospecting. This paid off to the extent of high-grade ore down to 600 ft., which not only changed the ore reserves picture but toppled the long-held theory that cinnabar ore could only be relatively shallow in Nevada. Cordero will probably, some time in 1946, take first place historically in Nevada production. To do this it must overtake the 10,000 (partially estimated) flasks put out by the old Mercury Mining Co. property near Ione, Nye County. This mine had its last company-operated furnace production in 1925.

Before leaving the subject of new developments, I must report the following item from the August, 1945, issue of one of the mining papers: "Los Angeles Mercury Find. Cinnabar float has been found in Arroyo Seco Park and the Park Commission is considering the request of Frank A. Campbell, a prospector, to prospect further for it." We are eager for further news from the home-and-garden front.

It should also be noted that mining company names are keeping right up with the times. There is an Atomic Corporation which, according to *Mining & Industrial News* of November, 1945, "controls quicksilver property at Hernandez, Calif. . . . near . . . New Idria. . . ."

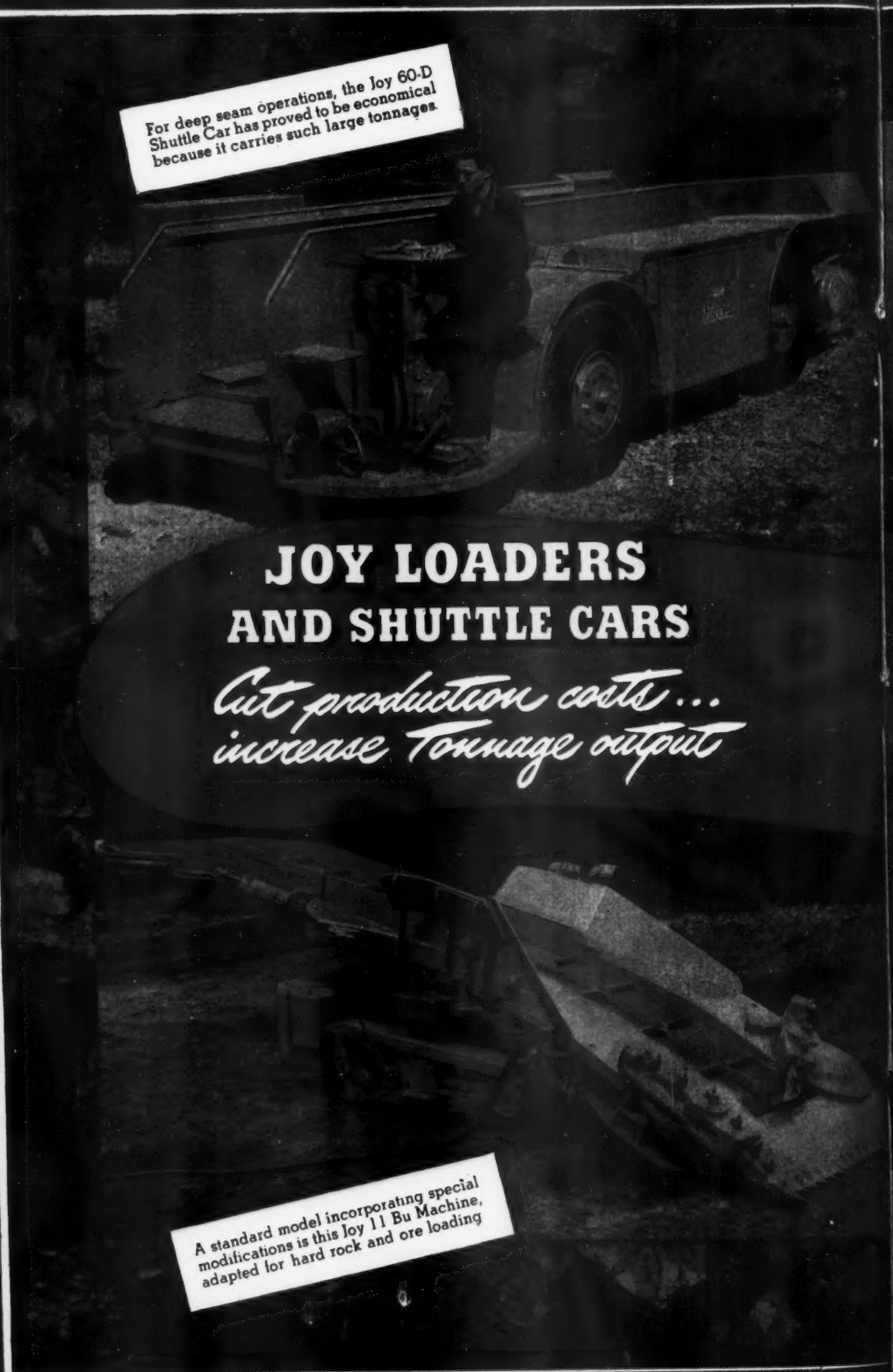
In the next (and, I promise, the concluding) installment of this space-filling effort, I will meander among recent advertisements having to do with quicksilver.

---

is not a sentiment - it is an economic necessity. —— *Charles Sumner*

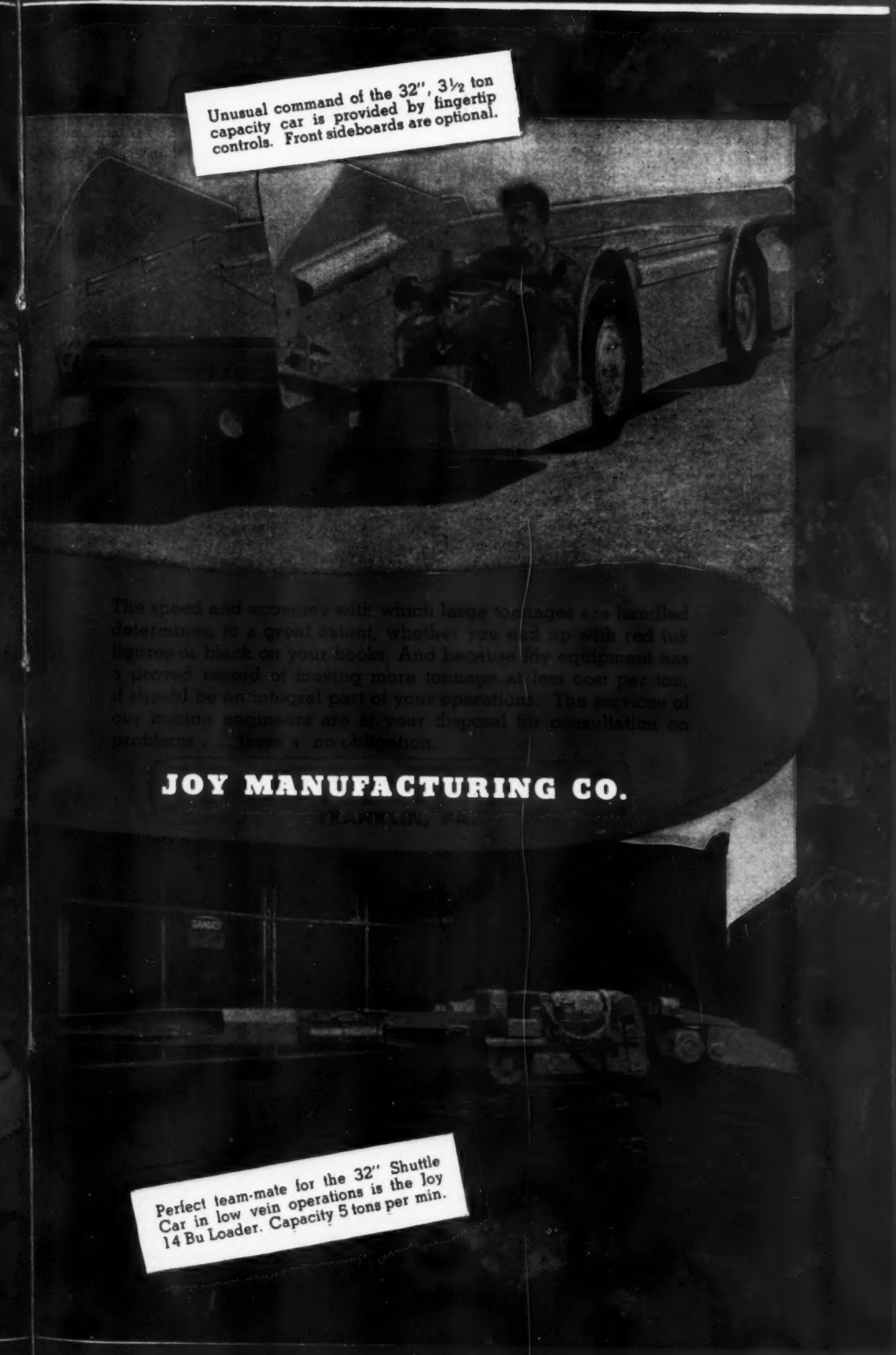
# Joy builds all products for

Call in a Joy Engineer

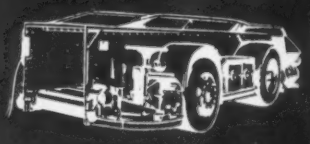

For deep seam operations, the Joy 60-D Shuttle Car has proved to be economical because it carries such large tonnages.
JOY LOADERS
AND SHUTTLE CARS
Cut production costs...
increase Tonnage output
A standard model incorporating special modifications is this Joy 11 Bu Machine, adapted for hard rock and ore loading

where the going is tough, the

# accuracy and operating ease



Unusual command of the 32", 3½ ton capacity car is provided by fingertip controls. Front sideboards are optional.



The speed and economy with which large tonnages are handled determines, to a great extent, whether you end up with red ink figures or black on your books. And because Joy equipment has a proved record of moving more tonnage at less cost per ton, it should be an integral part of your operations. The services of our mining engineers are at your disposal for consultation on problems . . . there's no obligation.

**JOY MANUFACTURING CO.**

FRANKLIN, PA.

Perfect team-mate for the 32" Shuttle Car in low vein operations is the Joy 14 Bu Loader. Capacity 5 tons per min.

experts say "Joy with Joy"

# Developing For The Future

## The Lake Creek Mine of Consolidated Coal Company, Opened to Produce War Tonnage, Is Now Completing Its Conversion to Peacetime Operation

By C. C. CONWAY
Electrical Engineer
and
FRED A. MILLER
Mining Engineer

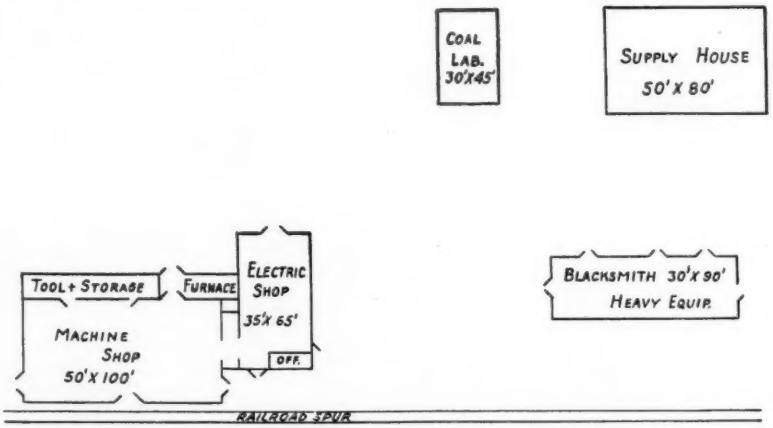
OUR COMPANY, with mines in southern and central Illinois, was among the early mechanical operators and since the installation of the first loading machine—many years ago—we have consistently followed the policy of trying to improve our record, knowing that we are a long way from the ultimate. During the numerous changes that have been made from hand to mechanical operation each new project has differed in some way from its predecessors and has incorporated what we believed to be improvements of previous practices.

Our newest project, the Lake Creek Mine in Williamson County, Illinois, illustrates this point. This operation was started under war conditions designed to produce emergency tonnage; consequently speed of development came first and many things had to be left undone. Now that the war is over and conditions have improved, we are proceeding to pick up a number of loose ends and to complete the installation according to our own ideas.

### Supply Center

A supply and shop center located about two miles from Lake Creek serves all of the company's mines in this district—furnishing parts and doing repair work. It is connected by hard surface roads to the other operations and also has a railroad spur for carload deliveries and shipments. The shop's purpose is to do all of the machine work, electrical rewinds, overhaul jobs, rebuilding jobs, and to fabricate and construct special equipment necessary for the operation of the mines.

The supply house and shop were located away from the immediate vicinity of any of the mines because previous experience with remotely located shops had indicated that there were several advantages. Where the main shop is located in close proximity to the mine, it has been our experience that the shop work is subject to continual interruptions and disturbances from so-called emergency jobs brought in from the mine and these disturbances make it difficult to maintain an efficient shop working schedule. Another point is that this separation prevents unauthorized use of shop tools and facilities and taking parts from the shop instead of through the regular supply procedure channels. To support this policy, it is needless to say that genuine emergency calls from the mines receive quick response with men and material as necessary.




Arrangement of buildings at shop center

The shop facilities at our center are rather complete; it is our object to be entirely self-sustaining as far as all maintenance and repairs are concerned and we are therefore equipped to do anything from light to heavy work, except foundry castings. The shop buildings were rehabilitated from a surface plant that was formerly located here; the structures are of brick or concrete block with steel roof trusses and asbestos sheet roofing. All are heated from a central steam plant with lines leading to the various buildings. Adequate capacity assures a comfortable working temperature. Fluorescent lights are used throughout. Following is a brief description of each of the buildings.

The machine shop is 50 ft. wide by 100 ft. long, exclusive of a 12-ft. by 100-ft. addition to house the furnace room and tool rooms, and is well equipped with lathes, milling machines, saws, grinders, etc. The electrical shop, which is 35 ft. by 65 ft., adjoins the machine shop in a separate building but with a door connection between. By means of an overhead crane in the machine shop and a mono-rail in the electric shop, heavy equipment can be exchanged between the two. The electric shop is equipped to do everything from emergency coil winding to complete rebuilding of armatures and motors; on the second floor is room for supply and storage of small parts. Close to the electric and machine shop is a building 30 ft. wide by 90 ft. long which contains the blacksmith shop in one end and the automotive repair shop in the other end. This latter has been found very convenient and economical for all

classes of truck repairs as well as tractor and other heavy equipment repair. In the blacksmith shop is located an air compressor, an acetylene generator and oxygen supply tanks. Three pipe lines—air, acetylene and oxygen—are carried to all shop buildings with convenient outlets. The supply house is 50 ft. wide by 80 ft. long; the ground floor has a small office for record keeping, with all parts completely card indexed. The balance of the first floor and the entire second floor are used for the storage of parts; a third floor, laid on the bottom chord of the roof trusses, has a large amount of space for keeping light-weight parts and material.

A smaller building 30 ft. wide by 45 ft. long is to be equipped and used as a laboratory where coal samples may be analyzed. Another building, 45 ft. by 160 ft., is under construction and when completed will be used for additional storage.

## Surface Plant

At the mine portal, with the exception of the tipple, there are only three surface buildings—all of concrete block construction; the wash house, the office, and the head house, the latter is built directly over the slope portal and contains the slope hoist engine, a man-trip waiting room and the lamp room. The wash house follows the conventional plan with showers, hanger baskets, etc. The office building which is still under construction but will soon be completed, is a two-story structure with offices for the mine, clerical and engineering staffs. The building is located below the tipple beside the load track where railroad scales have been installed and the scale house will be a part of the office building. On the opposite side there is a set of truck or wagon platform scales, also with weight recorders in a room in the office building. The building is modern in every respect with steam heating and air conditioning; for additional cooling in extremely hot weather, the roof can be flooded with water.

## Mine Slope

The coal has average cover of from 200 to 300 ft. and is reached by a slope on a 15-degree pitch. This was driven 19 ft. wide and has two compartments separated by a concrete curtain wall; a belt way and hoist way with track for supplies and man-trips. The belt is 36 in. wide and operates 450 ft. per min. with a capacity of 450 tons per hour. It is in two sections, set tandem, for a total length of about 1,500 ft. The hoist way ends at the No. 6 seam level—a slope distance of 911 ft. and the track from there leads off into the mine workings.

The belt compartment continues on below the No. 6 seam for a distance of approximately 600 ft. In so doing the slope passes through the No. 5 seam, which lies 40 ft. vertically below the No. 6 seam, and into the No. 4 seam. The No. 4 seam will be extracted sufficiently to form a sump or water storage to accommodate any shaft waters. At a point where the slope, continuing on below the No. 6 seam, passes under the first east entry, a temporary shaft type bin, equipped with a plate type feeder discharges directly onto the belt. A permanent bin of the same type, but over twice the vertical depth, will be placed in the third east entry as shown on the accompanying map.

The No. 6 coal is about 7½ ft. high, dipping at easy grades and with few serious bottom rolls. The pitch of course varies, which will necessitate some rock work to get uniform track grades for the main haulway now proposed. For the most part the roof stands well except in some areas where faults or displacements have occurred.

## Belt Conveyor System

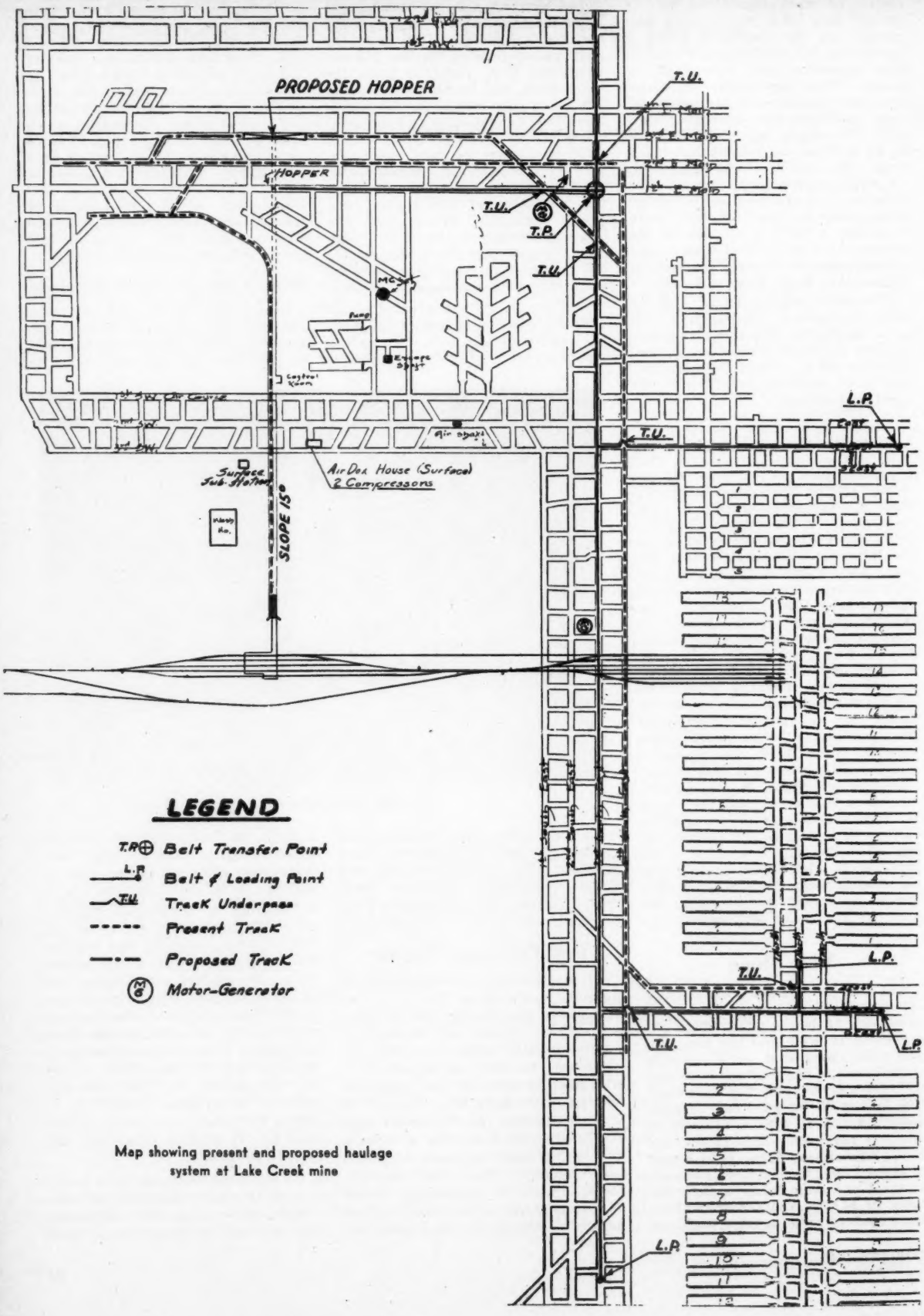
All underground transportation at present is by several lines of 30-in. belt conveyors, leading outbye from the working panels and discharging into the slope bin which (as previously explained) is simply a vertical shaft with a plate feeder at the bottom to load the main slope belt. This shaft is approximately 12 ft. square and 25 ft. deep with a capacity of 80 tons and is for temporary use until the main haulage construction is completed. The first inbye belt is laid on the main entries from the terminal hopper to the intersection with the southeast entries, a distance of about 800 ft. From there a second belt extends back to the intersection of No. 5 east; these both operate at a speed of 400 ft. per minute. A third belt laid up No. 5 east extends beyond the intersection of the north and south entries to the head of the east entries which are now under development. The two north and the south room panels have 30-in. belts operating at a speed of 300 ft. per minute which load onto No. 5 east. Another room panel off No. 2 east loads directly onto the southeast main belt. The entire belt layout is shown on the mine map.

## Mine Cars for Main Haulage

During the planning of the mine and in its early stages of development we have given a great deal of study to what type of equipment should be used for the main haulage—that is, whether to use belts or mine cars. Our company has had an extensive experience with both methods; being among the first to install 10-ton mine cars underground and our use of belt conveyors for gathering and intermediate haulage dates back over several years. So we had considerable data on which to base our judgment and our analysis indicated that for our conditions the advantages and disadvantages of both types were so evenly balanced that we were quite a long time in making the final selection. However, everything considered, we believe that under our present conditions we can combine mine cars with belts to advantage.

We are accordingly planning to use cars of 10-ton capacity for main line service; these will be the drop bottom type and will discharge into a large

Shuttles load directly onto belt




Map showing present and proposed haulage system at Lake Creek mine

capacity bin which is to be constructed under the main haulage and down to the slope belt. The track will be of 60-lb. steel-welded joints laid on treated wood ties. The main entries will be developed by belts, according to the present system, until they have advanced a sufficiently long distance for us to determine the average grade for that distance. This grade will then be established by taking top or bottom and the track will be laid to an approximately uniform line.

In coming to this decision a number of factors were taken into account. From our experience there is not much difference between the operating costs of mine cars or belts; neither one is automatic and both require about the same amount of labor and materials for their maintenance. To a casual observer, a mine belt in operation or a trip of 10-ton mine cars running on a smooth track gives the impression that these need little or no attention. However, anyone who has used either type of equipment knows that this is not the case; both systems can and will get out of order if not properly inspected and maintained. In our case the deciding factor between belts and mine cars was the installation costs and without going into detail our estimates showed that at Lake Creek Mine the mine car haulage could be installed for about 75 per cent of the belt cost.

Another reason, contributing to the decision to use mine cars, is the fact that a supply track is needed to move material and machinery from and to the working sections. While speaking of supply transportation, it may be appropriate to state here that in the mine working panels we use a rubber-tired "shuttle buggy" operated by storage battery for hauling supplies and repairs in and out of the working faces. This is our own design, made in our central shop and has a rather large truck body capable of handling timbers and general repair parts.

## Mining Plans

We have two mining plans for room panels and are now operating both of these methods to determine what advantages each may have over the other. The first plan is the straight room and pillar system in which six or seven rooms—whatever are necessary to provide the machines with a shift loading—are driven abreast; when these have reached a distance of 300 ft. the next battery is worked in a similar manner and so on until the panel is completed. Rooms may be turned either off one or two sides of the entries; the seam is sufficiently level to be worked in both directions as shown on the panel projection for Nos. 4 and 6 east.

The other method is called the "key system." This consists of five rooms advancing abreast, parallel to the panel entries, with lines of breakthroughs—which we call key cuts—driven periodically across the rooms and out to the panel entries. This key way serves as a convenient shuttle haulage from the room faces to the panel gathering belt and has the advantage of reducing the distance that the shuttle car travels. It also provides a continuous system which once started may carry on without change for a long distance; there is no starting or stopping the room progress and since the rooms are not completed at any specified limit, the equipment in them is simply moved ahead as they advance. As shown on the mine map, in the No. 2 east panel, the key cross cuts are driven about 120 ft. apart—which is an entirely arbitrary selection—and the shuttles travel through this way to discharge into the belt in No. 2 east.

## Shuttle and Belt Operation

Rooms are driven 28 ft. wide undercut with a shortwall and the face is blasted with six shots using permissible explosives. The coal is loaded with a Joy 11 b. u. into shuttle cars, operated by trailing cables. These have a capacity of five tons, measured on a clean coal basis.

The shuttle car has an elevated discharge, variable in height by means of a self contained air operated lift and loads directly onto the belt without the use of any intermediate device. At present one shuttle serves each loader.

The direct loading by the shuttle has given us no trouble although there is a small amount of spillage. The belt is what we term "slug loaded"; that is filled to capacity by the shuttle which discharges its load onto the belt in about one minute time. Provision of course is made to prevent belt overloading. On the room entry this is taken care of by the shuttle operator who waits until a clear space on the belt comes along. Where two panel belts discharge into a main belt overloading is prevented by an automatic cut out switch; this is an electrical contact set underneath the belt and adjusted to operate by the belt sag which occurs under full load. At such a time this contact cuts off the power from other belts which discharge close enough to cause interference. This device by the way is our own design and manufacture.

## Compressed Air Shooting

The coal at present is being blasted with permissible explosives but plans are completed for using air-dox. Two compressors are now installed on the surface; air at 10,000 lb. sq. in. will be taken into the mine by pipe lines through a bore hole and to the working places. These pipes are 1 in. outside diameter with approximately ⅛ in. walls.

## Underground Power

The power is purchased and comes from the transformers at 2300 v.a.c. with the tipple and hoist on the surface supplied at this voltage. The main cable is taken down the slope; this is a temporary installation and will be changed in the near future to a drill hole from the surface. The cable is 2/0 a.w.g. with a neo-prene jacket and is laid underground in a shallow trench along the rib. This cable line extends down the slope, along the mains and down the South East entries as far as No. 5 East. The main and South East conveyors are operated at 2300 v.a.c. taken directly off the power line but the other belts operate at 220 v.a.c. stepped down by an air cooled portable transformer. The machines in the working panels are operated at 275 v.d.c furnished by a motor-generator converter in the underground substation. Future plans call for an additional substation at the bottom of the borehole which has already been drilled and is located on the mine map.

## Underground Gobbing

Underground slate gobbing has been practiced here with considerable success. On the mine map, two rooms with connecting break throughs are shown in the barrier panel to the right of the slope. These are gob rooms in which the rock from the escape shaft was stowed. This escape shaft was sunk by first drilling a pilot hole from the surface to the entry underneath and then using this drill hole to dump the rock down to the workings. The rock was then picked up by the loading machine, loaded into a shuttle car and gobbed in these two rooms. By elevating the discharge end of the shuttle, a height of nearly 5 ft. can be reached. Stowing in this manner leaves a number of individual piles or cones of slate but a greater volume can be had by stacking with a second loading machine by swinging the boom, a level gob is made about 4 ft. to 6 ft. deep.

It will be noticed that to the right of these two entries there is another battery of three rooms with breakthroughs. This has been prepared to gob the material from the air shaft which is soon to be sunk on Second South West entry as indicated on the mine map.

---

The bituminous coal by-product, atabrine, is reported to be more effective than quinine in treating malaria.

* * *

Approximately 1,500 pounds of bituminous coal will be required to manufacture your new automobile, 20 pounds for an alarm clock, 100 pounds for a bicycle and 400 pounds for a washing machine.

# SPIRAL CONCENTRATOR Recovers Tantalum Ores at the Harding Mine

View of Humphreys spiral launders

**Overall Recovery of Microlite as Concentrate is 95 Per Cent**

By JOHN A. WOOD
General Manager
Harding Mine

THE Harding pegmatite, 8 miles east of Dixon, Rio Arriba County, N. Mex., is operated by Arthur Montgomery, of New York. It has been the principal producer of domestic tantalum ores since 1943.

Until April, 1945, recovery of tantalum minerals was achieved by batch-milling small lots of carefully sorted high grade ores at various commercial ore testing stations. Recently a small mill was erected on the Rio Grande River 12 miles west of the mine for the purpose of treating a mixture of low grade dump material plus low grade and high grade ores currently being mined from the pegmatite.

The operation is conceded to be of comparatively short life due to the necessity of maintaining a certain amount of high grade ore in the head feed; and the occurrence of this high grade ore is very erratic and not subject to geologic inference. The milling procedure is, however, of considerable interest since it is one of the first successful attempts to employ the Humphreys spiral launder in the recovery of values from a ground ore.

In the discussion that follows the term concentrate will apply to a mixture of microlite (calcium pyro-tantalate) and tantalite (niobate and tantalate of iron and manganese) in which microlite is predominant to the extent of 95 per cent. Concentrate as marketed contains 68 to 70 per cent $Ta_2O_5$ in contrast to the usual 50 to 55 per cent present in imported tantalite.

COMPOSITION AND CHARACTERISTICS OF ORE

| Mineral | Per Cent in Heads | Composition | Hardness | Specific Gravity |
|---|---|---|---|---|
| Microlite | 0.4 | $Ca_2Ta_2O_7$ | 5.0 | 6.3 |
| Tantalite | 0.03 | $(Fe, Mn)(NbTa)_2O_6$ | 6.0 | 6.0 |
| Spodumene | 5.0 | $LiAl(SiO_3)_2$ | 6.8 | 3.2 |
| Lepidolite | 1.0 | $KLi(Al(OH, F)_2Al(SiO_3)_3$ | 3.0 | 2.8 |
| Microcline | 3.0 | $KAlSi_3O_8$ | 6.0 | 2.5 |
| Albite | 2.0 | $NaAlSi_3O_8$ | 6.0 | 2.6 |
| Muscovite | 0.5 | $(H, K)AlSiO_4$ | 2.0 | 2.7 |
| Quartz | 85. plus | $SiO_2$ | 7.0 | 2.65 |

## Only Microlite and Tantalite Recovered

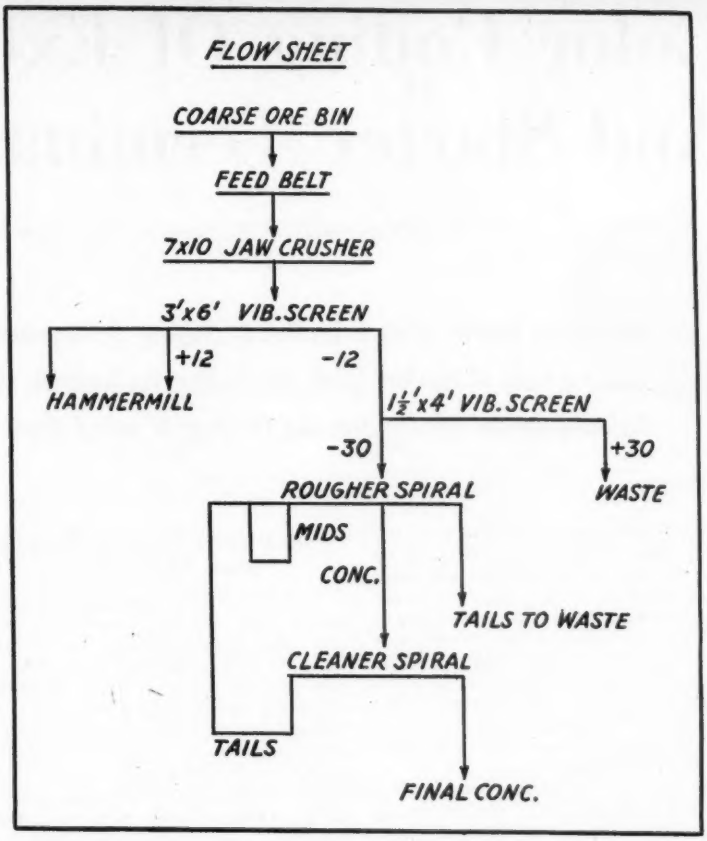
At the present time microlite and tantalite are the only two minerals being recovered for sale and of these two tantalite comprises only a fractional part. From the tabulation of characteristics it will be readily noted that microlite is not only softer than the majority of other minerals, but is also a great deal heavier. These two characteristics combine to make microlite easily liberated by impact grinding at a relatively coarse gangue size. Spodumene, however, during comminution breaks into platy, acicular fragments regardless of the method of grinding; and these fragments are very detrimental to easy separation of microlite by tabling. Previous experience had shown that ball-milling of this ore would entail a slime loss of microlite of approximately 30 per cent. Thus, hammermill grinding is

employed in order to liberate microlite by impact with resultant minimum of —200 mesh to be recovered.

The tantalum minerals are obviously well suited to recovery by gravity methods. For this operation Humphreys spiral launders were chosen for the following reasons: (1) economy of floor space, (2) ability to handle feed of fairly broad size range and, in addition, tests had shown that little interference in separation would be caused by spodumene plates, (3) simplification of middlings return, and (4) minimum of attendance required by operator.

## Feed by Gravity at Controlled Rate

Spiral feed (—30 mesh fraction from 1½ x 4 vibrating screen) is discharged by gravity from a 2-ton dry surge bin at a controlled rate, generally from 1 to 1.5 tons per hour; and into a make-up bin where water is added at the rate of 20 g.p.m. This bin has a volume of 5 cu. ft. and is shaped like an inverted pyramid with sides sloping inward and downward at 59 degrees from the horizontal to a 2-in. feed outlet in the bottom. Pulp is thus mixed and fed to one 5-turn rougher spiral by a 1½-in. Amsco-Nagle sand pump running at 1,250 r.p.m. Immediately ahead of the rougher spiral is a 6-in. x 14-in. stationary centrifuge, or density controller, with control valve for peeling off clear water to be returned to the make-up bin. This permits pulp to enter the spiral at desired density, usually 25 per cent solids. Rougher concentrate, which contains 50 per cent microlite or more, is drawn from the second, third and fourth ports of the spiral and fed by gravity to one 3-turn cleaner spiral. Rougher middlings are drawn from the fifth, sixth, seventh and eighth ports and returned to the feed circuit by launder to the make-up bin. Below the eighth port all material is waste and is laundered to tailings.




## Recovery of Concentrate

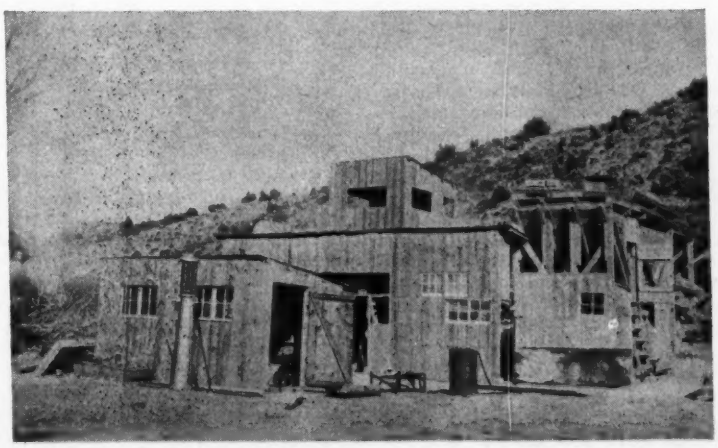
In the cleaner spiral finished concentrate is drawn from the second and third ports, all other material returning to the feed circuit.

Wash water for both spirals is clear and is supplied from a constant head tank at 20 lbs. pressure. Total water required is 35 g.p.m. for make-up and wash.

Once the spirals have been adjusted so that only a trace of microlite is returning to the feed circuit as middling from the eighth rougher port there is no chance for values to escape in the tailings for all microlite is trapped in the circuit until it passes out as concentrate. Another function of this closed circuit is that in event ore treated is exceedingly low grade, microlite can be built up in the circuit until the desired rougher separation occurs. Except under conditions of extreme variation of content of microlite, adjustment of spirals by the operator are unnecessary.

Concentrate is dried, passed over a scalping screen and packed in 100 lb. cans for shipment. Grade of concentrate is controlled by microscope and chemical analysis of shipments is made by Ledoux & Co.

Capacity of the mill is 12 tons per 8 hours and overall recovery of microlite as concentrate is in excess of 95 per cent.



Mill buildings at Harding mine

# Color Coding Of External Motor And Starter Terminals

*A Subcommittee Report to the Power Committee*

**To Promote Greater Safety in the Use of Electricity Underground, the Power Committee Is Proposing a Code of Standard Colors for Marking the Terminals of Motors in Mining Service. The Recommendations are Tentative and Comment Is Invited from Operators and Manufacturers**

IN THE September, 1943 issue of the MINING CONGRESS JOURNAL a report of this subcommittee was published wherein color coding standards were recommended for underground distribution power cables. There was a request for the application of these standards for polarity identification to external motor and starter terminals to both simplify and make safer the underground connection of both a-c and d-c motors.

As regards d-c motors used in the mining industry, only the 12 types have been considered for terminal color coding whose connections are illustrated in the accompanying diagrams. These are the motors recognized by the American Standards Association and the National Electrical Manufacturers' Association, commonly termed NEMA, and illustrated on pages 10 and 11 of ASA booklet, C-6.1-1944 and entitled "Terminal Markings for Electrical Apparatus."

In recommending a color code for the external terminals of these motors, the distribution cable color code has been kept in mind to prevent any confusion which might otherwise result. This is as follows for d-c service:

1. Black for the ungrounded or live conductor.
2. White for the grounded or return conductor.
3. Green for the equipment safety ground.

It was also necessary for the subcommittee members to keep in mind that multiple conductor colored cable is only manufactured in the following color combinations:

1. Black.
2. Black and white.
3. Black, white and green.
4. Black, white, green and red.
5. Black, white, green, red and orange.
6. Black, white, green, red, orange and blue.

## Compound Wound Motors Most Important

In developing a color code for d-c motor terminals, the compound-wound class was considered first on account of more of these motors being used in mining than any other kind. The non-reversing types only have four external terminals, including the one for safety ground, as compared to seven for the reversing types.

The $A_1$ armature terminal was selected as the black terminal since standard counter-clockwise shaft rotation facing the end opposite the drive is secured when positive polarity is applied to this connector. Terminals $S_2$ and $F_2$ in the reversing types become the white terminals, as these are the negative or opposite in polarity to $A_1$. In the case of the non-reversing motors it is recommended that the designation of the terminal $A_2$ be changed to either $S_2$ or $F_2$ or $S_2$ $F_2$. It is understood a group in NEMA already has a similar suggestion under consideration. Such designations are already standard for the reversing types.

The third color, green, would be for the terminal for the safety or machine ground. These terminals are not designated by initials in the diagrams.

The fourth color of red is assigned to the positive shunt field lead, $F_1$, and the fifth color of orange to the series field lead $S_1$. The sixth color of blue then falls to the negative armature lead $A_2$, which seems a good selection in that black and blue resemble each other and could be interchanged to secure reversal of shaft rotation.

## Series and Shunt Wound Motors

In the series and shunt wound motor types, the color coding scheme would be the same as that recommended for the compound wound motors.

In the series group however, only three colors would be required for the non-reversing types. The designation for the terminal $A_2$, as in the case of the compound motors, would be $S_2$ preferably. The fourth color of red would not be required for reversing series wound motors and the conductor of this color would become a second ground conductor, soldered at each end to the green conductor.

In the shunt group only four conductors are necessary for the non-reversing types. The designation for the terminal $A_2$ would become $F_2$ preferably. The fifth color of orange would not be required for reversing shunt wound motors and the conductor of this color would become a second ground conductor soldered at each end to the green conductor.

As regards the color coding of a-c motor and starter terminals the following standards are recommended:

**Single Phase**
Phase Wire—Black
Neutral Phase Wire—White
Safety Ground—Green

**Three Phase**
Phase Wire—Black
Phase Wire—White
Phase Wire—Red
Safety Ground—Green

The new color code is offered for the serious consideration of the mining industry and is entirely compatible with the code already approved by the American Mining Congress for power distribution cables.

Polarity Color Code Subcommittee:
D. J. BAKER, *Chairman*
P. M. BARLOW
M. K. CLAY
A. L. JOHNSTON
R. G. JONES
J. H. SANFORD
R. G. TURNEY
C. C. BALLARD, *Committee Chairman*

# CONNECTIONS & TERMINAL MARKINGS for D. C. MOTORS

## SHUNT WOUND

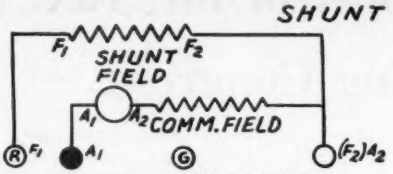



FIG. 1 NON-REVERSING COMMUTATING POLE TYPE

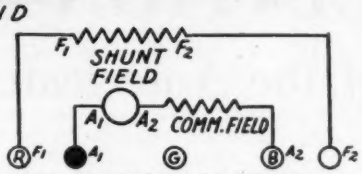



FIG. 2 REVERSING COMMUTATING POLE TYPE

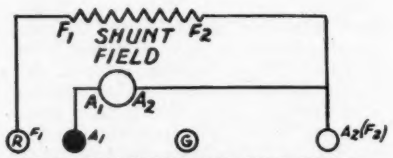



FIG. 3 NON-REVERSING NON-COMMUTATING POLE TYPE

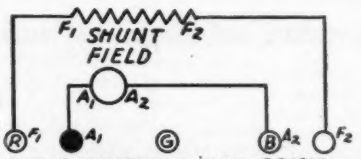



FIG. 4 REVERSING NON-COMMUTATING POLE TYPE

## SERIES WOUND

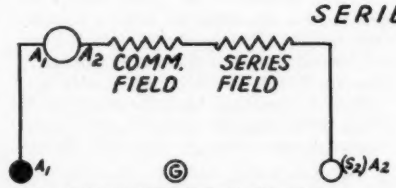



FIG. 1 NON-REVERSING COMMUTATING POLE TYPE

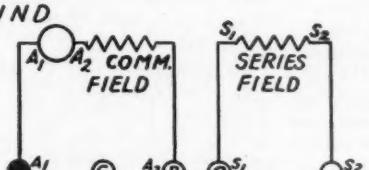



FIG. 2 REVERSING COMMUTATING POLE TYPE

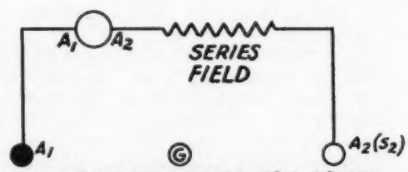



FIG. 3 NON-REVERSING NON-COMMUTATING POLE TYPE

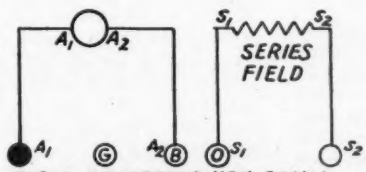



FIG. 4 REVERSING NON-COMMUTATING POLE TYPE

| LEGEND FOR COLORS | |
|---|---|
| WHITE | ○ |
| BLACK | ● |
| RED | Ⓡ |
| GREEN | Ⓖ |
| ORANGE | Ⓞ |
| BLUE | Ⓑ |

## COMPOUND WOUND

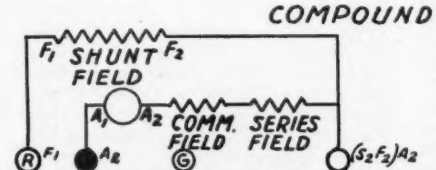



FIG. 1 NON-REVERSING COMMUTATING POLE TYPE

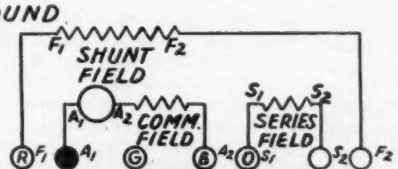



FIG. 2 REVERSING COMMUTATING POLE TYPE

FIG. 3 NON-REVERSING NON-COMMUTATING POLE TYPE

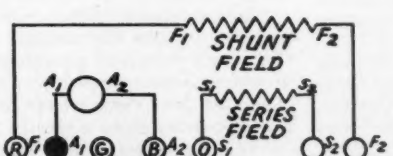



FIG. 4 REVERSING NON-COMMUTATING POLE TYPE

# DEPRECIATION—Report of the Tax Committee of the American Mining Congress

**A taxpayer's investments in plant and equipment should be recoverable from profits through adequate depreciation allowances. Criticisms are here made of present procedures and changes are recommended**

### *Provisions of Existing Law*

THE essential provisions of the present Internal Revenue Code regarding depreciation (omitting certain special provisions not here under discussion) are the following:

SEC. 23: In computing net income there shall be allowed as deductions:

* * *

(l) Depreciation.—A reasonable allowance for the exhaustion, wear and tear (including a reasonable allowance for obsolescence)—

(1) of property used in the trade or business, or

(2) of property held for the production of income.

* * *

SEC. 114 (a): "Basis for Depreciation.—The basis upon which exhaustion, wear and tear, and obsolescence are to be allowed in respect of any property shall be the adjusted basis provided in section 113 (b) for the purpose of determining the gain upon the sale or other disposition of such property."

Section 113 (a) specifies that the "unadjusted basis" of the property shall be its cost except as some other basis (as to gifts, exchanges, reorganizations, etc.) is required. Section 113 (b) specifies adjustments to be made to give the "adjusted basis" which will be the basis for depreciation, including the following:

SEC. 113 (b) (1): "Proper adjustment in respect of the property shall in all cases be made— . . .

"(B) in respect of any period since February 28, 1913, for exhaustion, wear and tear, obsolescence, amortization, and depletion, to the extent allowed (but not less than the amount allowable) under this chapter or prior income tax laws. . . .

"(C) in respect of any period prior to March 1, 1913, for exhaustion, wear and tear, obsolescence, amortization, and depletion, to the extent sustained."

These provisions outline what may be considered generally fair and equitable standards for depreciation. The difficulties arise through decisions, rulings or administrative procedures which govern their practical application. Without departure from the basic principles of the law, certain changes are recommended to give those principles fairer and more equitable application.

No exception can be taken to the basic provision for "A reasonable allowance for the exhaustion, wear and tear (including a reasonable allowance for obsolescence)"—here referred to as "depreciation." The general standard as set forth in the Regulations (Sec. 29.23 (l)-1) is that "the aggregate of the amounts so set aside, plus the salvage value, will, at the end of the useful life of the depreciable property, equal the cost or other basis of the property determined in accordance with Section 113." The Regulations call for "a reasonably consistent plan (not necessarily at a uniform rate)."

Both law and Regulations thus recognize it is not possible to foresee the exact length of useful life of any depreciable property, nor to determine exactly how much should be set aside out of the profits of any year as its ratable contribution to the total amount which on termination of the useful life of the property should have been provided to amortize its basis fairly against the profits derived from its use. Unless the property investment has been effectively recovered out of profits during the useful life of the property, the income of its period of usefulness has not been properly determined. The investment is not recovered out of losses but only out of profits.

The usefulness of the property will not be uniform throughout its life. Not every year will provide an equal fund from which recovery can be made. The law has very wisely made no attempt to lay down a specific formula or rule for determining the amount of depreciation which should be allowable for each year. It has only required that the allowance should be "reasonable" and it grants the reasonable allowance as a deduction from income. The difficulties come in determining the amount of that reasonable allowance, and this in turn rests to some extent on determination of the standard of reasonableness. It is to clarify this situation that the following recommendations are made:

### *I. Tax Benefit Rule:*

The essence of the tax benefit rule is that no depreciation should be considered as having been allowed or allowable unless it gave a tax benefit; i. e., unless it could be effectively applied to decrease taxable net income from the amount which would have been shown without such deduction.

As previously noted, recovery of basis for the property can only be made out of profits, since losses yield no fund from which investment can be recovered. To the extent that the net loss of any year may be carried forward or carried back and constitute a reduction of taxable net income of some other year or years, any excess depreciation of the loss year would be effectively allowed. The present law limits the carry-over from net losses to a two-year period before or after the year of loss. Even if the length of that period should be extended, there would still be the possibility that a loss might not be fully deductible against income of other years. For any probable period of loss which may be allowed there would still be occasion to write the tax benefit rule into the law, so that adjustment to the basis under Section 113 (b) should be limited to the amount which has been effectively allowed or allowable in reduction of taxable income.

The adjustment required by Section 113 (b) applies in two ways: First, in determining the depreciation allowable in subsequent years; and, second, in determining the gain or loss on sale or other disposition of property. In each case the principle of the adjustment is that as the taxpayer is allowed to reduce his taxable income from year to year by allowances for depreciation, his original basis for the property is reduced by the allowances thus made to him.

Therefore, in subsequent years he is only entitled to depreciation of the amount which he has not yet thus recovered, and on sale of the property he is only entitled, in computing gain or loss, to deduct so much of the basis as he has not theretofore recovered through depreciation. To the extent that depreciation serves only to increase or to create a loss which does not effectively reduce taxable income, the taxpayer has not made recovery of his basis. No argument that depreciation is allowed even though it merely serves to create or increase a loss changes this fact of taxpayer's non-recovery.

The tax benefit rule has otherwise been recognized in recent amendments to Section 22 (b) (12) as to recovery of bad debts, taxes previously paid, etc., to allow for amounts which did not result in the reduction of tax of a prior year.

Some of our courts have felt the tax benefit rule should be considered applicable to depreciation even under the law as it now stands, but our highest court (by a 5 to 4 decision) has held that under present law that rule does not apply to depreciation.

Recognizing the effect of present decisions, the law should be amended to make the tax benefit rule fully applicable to depreciation computations.

The application of the tax benefit rule may be illustrated as follows:

(1) Assume depreciation allowable at $10,000 a year on property which cost $100,000. After 10 years the Bureau would hold $100,000 depreciation had been allowed (or allowable) even if in three years, for example, because of losses $30,000 of the total $100,000 depreciation was not and could not have been allowed as an effective reduction in taxable income for the period. If the property continued in use after the tenth year no further depreciation would be allowed and there would be $30,000 of the original cost which the taxpayer would never be permitted to recover in reduction of taxable profits under present rules.

If after the tenth year the property should be sold, the Bureau would hold that its entire $100,000 original cost had already been fully depreciated and its basis reduced to zero, so the entire amount received on the sale constituted taxable income, without recognition that $30,000 of cost had never been allowed or allowable in reduction of the taxpayer's profits subject to tax.

The tax benefit rule would recognize that at the end of 10 years only $70,000 had been effectively allowed or was allowable as deductible depreciation, so the property still had an unrecovered basis of $30,000; subject to further depreciation allowance if the property continued in use, or deductible in computing taxable gain if the property were then sold.

(2) If question as to the tax benefit rule arose before, instead of at, the end of the previously estimated useful life of the property, its application can be illustrated as follows:

Again assume property cost $100,000 and that depreciation has been considered allowable at $10,000 a year up to the end of the eighth year, at which time question is raised as to whether the 10-year period should still be adhered to or whether some longer life should then be estimated. Also assume that during the eight-year period there had been a similar $30,000 of depreciation which, because of losses, was not and could not be allowed in effective reduction of taxable income. The Bureau would still hold that the full $80,000 had been allowed or allowable (whether or not with any tax benefit) and that there was only $20,000 remaining basis for the property for further depreciation. If it estimated the property would still have a remaining five years life (after the eighth year) instead of only two remaining years of the originally estimated life, it would divide this remaining $20,000 by five and allow only $4,000 a year depreciation. At the end of its thus estimated life the depreciation effectively allowed as a deduction would similarly be only $70,000 (five years at $10,000 a year and five years at $4,000 a year), leaving $30,000 of cost which the taxpayer had not been permitted effectively to deduct in computing taxable income.

Under the tax benefit rule, on making the recomputation at the end of the eighth year it would be recognized that only $50,000 of depreciation had been effectively allowed and the property had a then remaining basis for further depreciation of $50,000 which, spread over the remaining five years of then estimated life, would be an amount of $10,000 a year. Thereby the taxpayer would have had effective recovery at the end of the period of its entire $100,000 cost.

If at the end of the eighth year the property was sold, the Bureau under present rules would hold that $80,000 had previously been allowed or allowable, so the property had a then remaining basis of only $20,000 to deduct in computing its gain on sale of the property. Under the tax benefit rule, it would be recognized that only $50,000 of cost had been recovered against taxable income and the remaining $50,000 of cost would be the property basis deductible in computing any gain on the sale.

The foregoing illustrations are both assuming depreciation allowable on the straight-line basis at the same ratable amount each year, but the same principle would be applied if depreciation were computed on a production unit or other basis; viz, that any depreciation otherwise attributable to any year which could not be effectively applied in reduction of taxable income would not be considered as depreciation which had been effectively allowed or allowable and hence should not be considered as applicable in reduction of property basis for further depreciation or for computing gain or loss on disposition of the property.

HENRY B. FERNALD
Chairman, Tax Committee

## *II. Determination of Amount Previously Allowed or Allowable:*

Treasury regulations seem quite unfairly to interpret the provisions of Section 113 (b) (1) (B) as to the adjustment to be made for depreciation, etc., "to the extent allowed (but not less than the amount allowable) under this chapter or prior income tax laws." In Regulations Section 29.113 (b) (1)-1, an example is given where over a seven-year period the amount allowed was $39,500 but the amount now determined allowable aggregated $42,000 (on a somewhat different scale); and by taking the amount allowed or allowable, whichever was greater in any year, the Bureau computes the amount "Allowed, but not less than amount allowable," to be $44,000. Under its interpretation the basis of the property for depreciation or for computing gain or loss is to be decreased by this amount of $44,000 which is $4,500 more than the amount theretofore allowed and $2,000 more than the amount theretofore allowable.

We believe the law was intended to reduce the basis for computing gain or loss or for subsequent depreciation by the *aggregate amount* theretofore allowed or theretofore allowable, whichever was greater. In this example, reduction would then be made for the amount of $42,000 theretofore allowable, since this was more than the $39,500 which had theretofore been allowed. Adjustment should not be made for the $44,000 which is greater than either the amount allowed or the amount allowable.

Another example is given in Section 29.23 (l)-5 of the Regulations, which shows that where over a period of five years the amount previously allowed was $5,000 and the amount allowable for such period would likewise have been $5,000, nevertheless the Regulations state adjustment is to be made in an aggregate amount of $6,666.67.

As will be seen by these examples, a mere change in the method of depreciation which would give differences in the amount allowable for different years but without any change in the aggregate which would have been allowable from the amount which was actually allowed could give rise to a greater adjustment which would deny to the taxpayer some of the depreciation to which he was entitled in future years.

Any question regarding this should be clarified by amendment to Section 113 (b) (1) (B) to specify that it is the aggregate amount allowed and the aggregate amount allowable to which reference is there made. In determining such aggregate amounts, the tax benefit rule should be applied in determining what was the amount allowed or the amount allowable for any year.

### *III. As to the Burden of Proof:*

Under existing law the taxpayer, on appeal to the Tax Court with respect to a deficiency or to other courts with respect to a refund claim, has the burden of proof to establish that the Commissioner has been in error in any determination he has made. Accordingly, when the taxpayer appeals to the court with respect to depreciation he must establish that the Commissioner has not made what can be considered a reasonable allowance within the intent of the law. It is not enough for the taxpayer to establish that the amount claimed on the tax return was a reasonable amount. It might be conceded that the taxpayer's claim as to method, rate and amount of depreciation was an entirely reasonable allowance for that year, yet the taxpayer would have on him the burden of proof to show that the allowance stated by the Commissioner could not likewise be considered reasonable. There are, of course, cases in which the Commissioner could show that a taxpayer's claim had not been reasonable and likewise cases where the taxpayer could prove that the Commissioner's allowance was not reasonable, but depreciation is generally a matter of opinion and judgment rather than a matter of proof. For example: It might be conceded that depreciation at 6 per cent claimed by the taxpayer was a reasonable amount; yet a 4 per cent allowance made by the Commissioner would be upheld by the courts unless the taxpayer could sustain the burden of proving that the Commissioner's allowance could not be considered reasonable.

The taxpayer can never be allowed in the aggregate more than the full amount of his tax basis for the property. If, however, year-by-year allowances are inadequate, the aggregate of such allowances when the property becomes useless may be less than its basis (less recoverable salvage) and the taxpayer may not have income in the final year or years against which that loss could be recovered.

The Government is in the long run protected because the taxpayer can never charge off more depreciation than the full amount of the property. That limits the aggregate deductions he can take. With the Government thus protected, it should exercise great liberality in allowing to the taxpayer from year to year any amount which can be considered reasonable.

The present policies of restricting depreciation to minimum amounts allowable are not conducive either to investments in new plant and equipment or to replacements of existing depreciable property not yet fully amortized. We are particularly concerned at this time with the need for reconversion and reemployment. This involves new plant and equipment and replacement of old where needed for expansion, reconversion and efficient operation. One who has equipment not yet fully amortized in his accounts is hesitant to scrap it even though he recognizes that new equipment might be more efficient. One who is considering investment in new equipment is hesitant to make it if doubtful of recovering its cost during its useful life. In either case there may be failure to provide the employment which production of the new machinery would give. There is also failure to give the employment which the expansion through use of the new machinery would give. It is particularly urgent that at this time liberal depreciation policies should be adopted.

The Bureau has a definite preference for "straight-line" depreciation; —writing off equal amounts each year during the estimated life of the property. It recognizes that other methods are proper and gives its definite sanction to use of the "production" basis for computing these charges where a unit-of-production basis can be satisfactorily developed.

The Bureau has not been much inclined to the use of the "decreasing balance" or "declining balance" method, which is commonly used in England and which, in many cases at least, seems most nearly in accord with the relative decline in usefulness of the depreciable property. Because a better understanding of it seems needed, the following explanation is given. Under this method depreciation is computed on the net balance which remains for any year after deducting from cost (or other basis for the property) the depreciation previously allowed (or allowable).

The working out of this method may be illustrated by the following examples of 10 per cent and 15 per cent rates applied to the decreasing balances:

| | @ 10 per cent | | @ 15 per cent | |
|---|---|---|---|---|
| | Balance 1st of year | Depreciation for year | Balance 1st of year | Depreciation for year |
| 1st year | $1,000.00 | $100.00 | $1,000.00 | $150.00 |
| 2d year | 900.00 | 90.00 | 850.00 | 127.50 |
| 3d year | 810.00 | 81.00 | 722.50 | 108.38 |
| 4th year | 729.00 | 72.90 | 614.12 | 92.12 |
| 5th year | 656.10 | 65.61 | 522.00 | 78.30 |
| 6th year | 590.49 | 59.05 | 443.70 | 66.56 |
| 7th year | 531.44 | 53.14 | 377.14 | 56.57 |
| 8th year | 478.30 | 47.83 | 320.57 | 48.09 |
| 9th year | 430.47 | 43.05 | 272.48 | 40.87 |
| 10th year | 387.42 | 38.74 | 231.61 | 34.74 |
| 11th year | 348.68 | 34.87 | 196.87 | 29.53 |

Most of our depreciable property has its maximum usefulness in its early years of life. That is when its earnings are apt to be greatest and its cost of maintenance and operation least. Machinery is generally not installed without the expectation that it will pay for itself, or largely pay for itself, in the first five years of its life. Improvements in machinery are so rapid and changes in requirements are so frequent that any new installation is apt to be obsolete within that period. It is true that obsolete equipment may still be continued in use, even though its relative earning power is greatly reduced or even vanishes, but it is prudent and desirable that adequate depreciation reserves should be provided in the early years before the equipment becomes obsolete or its earning power is impaired. The decreasing balance method recognizes this, and ascribes higher depreciation

to the earlier than to the later years. Under this method no item is ever fully depreciated, but the remaining balance is rapidly reduced toward a probable salvage value. There is never any question of writing off more than 100 per cent depreciation.

It is not necessary to keep a separate accounting for individual items, since the rate can be applied to the net balance (cost less prior depreciation) in the entire account, whether the various items included therein are one year, or five years or ten years old. The method can be started at any time with the net balance then in the account representing cost less prior depreciation (whether those depreciation computations were by this or some other method).

It cannot be said that this is always the best and fairest method to use. Generally, equipment has its greatest useful value in its early years, but sometimes it may require a considerable period before the full earning power of new equipment can be realized. For example, if equipment is installed for a new product, it may take some time to build up a profitable demand for full production; or it may take some time to train operators in efficient operation of new equipment, etc. Undoubtedly there is some equipment which can be expected to have earnings continue virtually unimpaired for many years, and for which the "straight-line" method or the unit-of-production method may be manifestly proper.

Conditions vary so greatly for different kinds and uses of equipment, and change from time to time, so there is no one method or rate which can be considered as always the right one to use. This is recognized by the law and by Bureau regulations and procedures.

However, under present law, whatever method, rate and amount of depreciation the Commissioner (or those who act with his authority) may determine to be a reasonable allowance will be sustained by the courts on an appeal from his determination unless the taxpayer can sustain the burden of proof that the amount as allowed is not reasonable,—even though the court might recognize that some other method or greater amount claimed by the taxpayer was also a reasonable allowance.

The fact that, on any appeal to the courts, a decision of the Commissioner will be sustained unless the taxpayer can meet the heavy burden of proof, has led to some thought in the Bureau that it is the Commissioner's right, and even his duty, to hold his allowances down to the minimum which the taxpayer could not prove in court was inadequate.

With all the uncertainty as to what will prove to be the ultimate useful life of any depreciable property and its relative utility in each year of that life, the burden of proof is so difficult that the taxpayer often feels compelled to accept what he is confident is less than a reasonable allowance rather than to try to sustain the burden of proof as to a matter which is inherently uncertain. Naturally, a taxpayer is hesitant to make new investments if he feels that under the system established for granting allowances he is apt to be denied the allowances which would return to him out of earnings the amount of his investment.

Briefly, we have this situation: The taxpayer's money is expended for equipment, anticipating that this amount (plus a profit thereon) can be recovered out of future earnings which will result. The expenditure is not deductible when made, nor is it deductible in full before the Government steps in to take its tax share of asserted income,—actually estimated profits. The taxpayer who has spent the money must wait for its recovery until that comes over a series of future years from *reasonable* depreciation allowances deductible from earnings. The taxpayer cannot receive more than is reasonable but he should receive the full allowance which is reasonable. After all, it is the taxpayer who has invested his money and who stands the risk, makes the effort and sustains the delay in that recovery. If the taxpayer claims no more than a reasonable allowance for recovery of that investment, he should be entitled to that allowance.

Our system of placing burden of proof on the taxpayer should be changed, and the taxpayer should be allowed the amounts claimed except and to the extent that the Commissioner can show that the amounts claimed are clearly unreasonable.

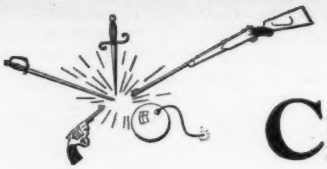
## Conclusion

Without change in the basic principles of the law, we believe the law should be amended—

(I) To apply the tax benefit rule so that depreciation would not be considered as having been allowed or allowable except to the extent that it resulted in a tax benefit to the taxpayer.

(II) To change the provisions of Section 113 (b) (1) (B) to specify that in arriving at the adjusted basis for the property the adjustment should be for the *aggregate amount* allowed (but not less than the *aggregate* amount allowable),—understanding that the tax benefit rule would be applied in determining the amounts allowed or allowable.

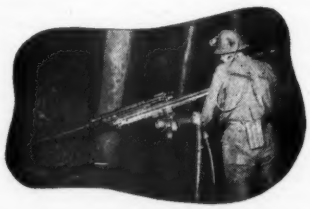
(III) To the extent that depreciation claimed by the taxpayer as to method, rate and amount is reasonable, it should be allowed and in any court proceeding the burden of proof should be on the Commissioner to establish to what, if any, extent the taxpayer's claim was not reasonable.



# *Choose your weapons* against high mining costs!

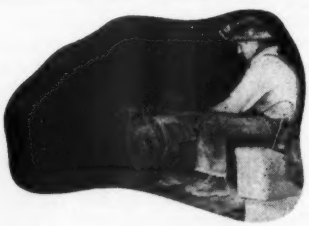
**Every** piece of Gardner-Denver equipment shown here is engineered to help you win the battle for more tonnage at lower cost. Every piece has special features, designed to help you get more work done more economically.

**EASIER TO HANDLE** *because of better balance. Self-cleaning to keep out water and slush. Plenty of power for the hardest rock. That's why the R-104 Stoper sets records for footage and economy—and why it stays underground.*

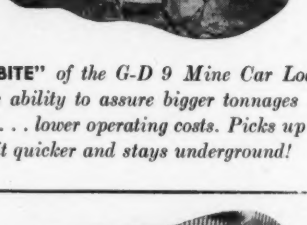


**AUTOMATIC ACTION** *in the Gardner-Denver CF89-H Continuous Feed Drifter feeds the drill to suit the ground—eliminates manual adjustment—holds drill continuously in correct striking position. No wonder this drill piles up footage!*

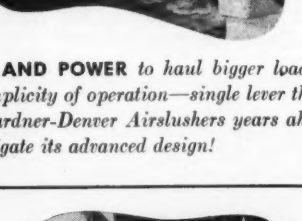
**THE "BIG BITE"** *of the G-D 9 Mine Car Loader is the secret of its ability to assure bigger tonnages . . . faster production . . . lower operating costs. Picks up more rock, discharges it quicker and stays underground!*



**STRENGTH AND POWER** *to haul bigger loads faster—amazing simplicity of operation—single lever throttle control—put Gardner-Denver Airslushers years ahead of the field. Investigate its advanced design!*



**WITH MAXIMUM CAPACITY** *for forging bits and shanks, or making the upset for threading on the largest sections of drill steels—latest improvements in sharpener design—the Gardner-Denver DS 6 Drill Steel Sharpener provides clean, sharp bits always.*



**BIG PERFORMANCE** *with a small, compact compressor—that's what Gardner-Denver WB Vertical, 2-stage Water-cooled Air Compressors give you. These compressors have efficiencies comparable to those of large Horizontal Compressors.*

**For complete information, write Gardner-Denver Company, Quincy, Illinois**

**GARDNER-DENVER**

***Since 1859***

# WHEELS OF GOVERNMENT

### As Viewed by A. W. DICKINSON of the American Mining Congress

THE Congress will reconvene on January 14, at which time all legislative measures will stand in the same position held at the time of adjournment of the Senate and House on Decembr 21. Beyond the repeal of the excess profits tax, accompanied by moderate reductions in corporate and individual levies, the past few months were not marked by the enactment of any outstanding legislation. The President did get his measure for reorganization of the Government departments and agencies, and the extension of the Second War Powers Act carrying the rationing authority, but little else was accomplished.

## Senate Approves Stockpiling

Only one day before the adjournment on December 21, the Senate passed and sent to the House Committee on Military Affairs the Thomas-May Stockpile bill, S. 752, in the form described in the December issue of the JOURNAL. In charge of the bill on the Senate floor was Senator O'Mahoney of Wyoming, who had conducted the hearing on October 30 and who sponsored the report on the measure by the committee on November 29. While the bill was under consideration on the Senate floor, Senator Pat McCarran of Nevada offered an amendment which would have authorized contracts for stockpile purchases from domestic marginal producers at prices up to 25 per cent above current markets; such contracts to run up to three years. The Senator withdrew his amendment under heavy fire from the minority side of the Senate.

Interesting at this point was the criticism of a member of the Military Affairs Committee, Senator Revercomb of West Virginia, who stated, "I wish to say that this very subject was discussed in the committee and it was the very general contention of the committee that nothing of this kind should be done. . . . It is my earnest hope that in this bill, which provides for stockpiling, we shall not embark upon a subsidy program. Marginal mines for the production of strategic metals grew up during the war. They were necessary then. They were paid a price which permitted them to operate because under the demand for war metals that could be done to meet the exigencies of wartime need. But that condition no longer exists, and there is no duty upon the Government to carry these mines, these privately owned enterprises, by means of subsidies."

Inasmuch as the Thomas-May bill is understood to have the general approval of the Administration and of the Executive Departments concerned, it is believed that quick action will be taken by the House Committee on Military Affairs soon after the reconvening of Congress. Meanwhile Section 22 of the Surplus Property Act of 1944 expired by statutory provision January 2, 1946, but the Surplus Property Administration has extended the life of Regulation 17, which deals with owning-agency transfers of strategic materials to the permanent stockpile, to April 1, 1946.

## Industrial Strife—Fact-Finding

The industrial unrest which has centered largely in the automobile, steel, oil and electrical industries has not found its solution in the fact-finding boards appointed by the President. A further White House statement, authorizing fact-finding boards engaged in investigating labor disputes to examine the books of employers and to suggest broadening of price control to enable employers to meet wage increases, was issued late in December. Representatives of the General Motors Corporation withdrew from participation in the investigations being conducted by a fact-finding board into its wage dispute.

G. M.'s spokesmen have inquired flatly if American business is to be conducted as a competitive system, or if the determination of essential economic factors such as costs, prices, profits, etc., upon which business success and progress depend, are to be made politically by some Government agency instead of by the management appointed by the owners of the business for that purpose. The company declared that it will not participate voluntarily in what stands out crystal-clear at the end of the road—a regimented economy—and states, "If this is what the American people want, they must make that choice through their accredited representatives in Congress." Meanwhile the auto company is continuing negotiations with its employes.

The Administration's "Fact-Finding" bill has been the subject of hearings before the House Commit-

## Washington Highlights

**CONGRESS:** Adjourned December 21 to January 14.

**WHITE HOUSE:** Fact-Finding bill meets opposition.

**STOCKPILING:** Senate passes Thomas-May bill, S. 752.

**"FULL EMPLOYMENT":** President urges adoption of Senate bill.

**SMITH-CONNALLY ACT:** House rejects repeal measure.

**ANTI-RACKETEERING:** Hobbs bill now in Senate.

**GWYNNE BILL:** May pass House in January.

**MINIMUM WAGE:** House may approve increase to 50 cents.

**STRIKE BALLOTS:** NLRB forbidden to spend money.

**USES:** Veto blocks restoration to States.

**FOREMEN'S UNIONS:** Employer directed to recognize.

**BRETTON WOODS:** Agreement signed December 27.

**TAXATION:** War excises bill set for April.

**GOLD:** Engle bill would compensate losses under L-208.

**SILVER:** Price may be set around $1.00.

**ST. LAWRENCE:** Hearings expected in February.

tee on Labor, now recessed until Congress returns; the Senate Committee on Education and Labor will start hearings January 14. The bill provides a "cooling-off" period consisting of five days after the Secretary of Labor certifies a dispute, 20 days for the fact-finding boards to investigate and report, and another five days following the presentation of the report to the President. During this period it would be unlawful to strike. Investigation and subpoena powers are given similar to those authorized under the National Labor Relations Act.

Thus far representatives of organized labor have voiced strenuous objection to the "Labor Fact-Finding Board's Act." One objection made by AFL's William Green is that the 30-day outlawing of strikes will make unions subject to court injunctions and suits for damages. The particular objection of industry witnesses is directed to the wide subpoena power which could be used to spearhead "fishing expeditions" into company records. Concern is also felt over the power of the fact-finding boards to make recommendations which could readily become the equivalent of compulsory arbitration.

## "Full Employment"

The more moderate "Employment-Production Act" substituted by Representative Carter Monasco's House Committee on Expenditures for the Administration's "Full Employment" bill was approved by the House December 14. The measure now goes to conference with the far more radical bill which passed the Senate and the President has appealed to the conferees, stating that in his opinion, "No bill which provides substantially less than the Senate version can efficiently accomplish the purposes intended." House members have repeatedly voiced vigorous opposition to the Senate form of the bill carrying the implication of a Government guarantee of jobs.

## House Labor Action

The House by a close vote on December 11 rejected consideration of the Smith bill, H. R. 3937, repealing the Smith-Connally Labor Disputes Act provisions for plant seizure and NLRB strike votes, and also penalizing unions violating no-strike provisions in their contract. The bill is thus blocked for the present; so also, unfortunately, is consideration of an intended amendment which would have excluded unions from recognition as collective bargaining agents if they include supervisory or professional employes in their membership.

Following the set-back on the Smith bill, the House relented to the extent of approving the "Anti-Racketeering" bill by Representative Hobbs of Alabama. This measure bars the levying of charges for union dues or fees against drivers of "over-the-road" trucks, declares such interference with commerce to be a felony and provides as penalty for violation, 20 years' imprisonment or $10,000 fine, or both.

Still pending before the House under a granted rule is the Gwynne bill, which would limit back pay claims and other action under Federal statute to a one-year period.

Neither the House nor the Senate Labor Committee have reported the bill increasing the minimum wage under the Fair Labor Standards Act from 40 cents to 65 cents and later to 75 cents per hour. Further hearings are to be held by the Senate subcommittee after the Congress reconvenes. It is the general opinion that the House Committee will report a measure increasing the minimum wage to 50 or 55 cents per hour.

White House approval of the $2.5 billion deficiency bill has stopped the taking of strike ballots by the NLRB, as the bill contains a definite prohibition against the expenditure of any money for this purpose. The veto of the $51-billion "rescission" appropriation bill has knocked out, for the time being at least, a provision contained as a rider returning the U. S. Employment Service to the States within 100 days. Whether the veto will be sustained or overridden when Congress resumes remains an open question.

## Foremen Unions

On December 8 the NLRB directed the Packard Motor Car Company to bargain with a Foremen's Union as the exclusive representative of this type of employe. The new NLRB Chairman, Paul M. Herzog, commented, "We are not concerned with the foremen's relation with their subordinates, but with their own status vis-a-vis the company that hires, discharges and compensates them and that directs their work."

In dissenting, board member Reilly stated, "The additional documentary evidence contained in this case strengthens my inference that the charging union is not truly independent, but rather an organization whose fate is inextricably bound up with the policy of the United Automobile Workers, the CIO Union which represents the rank-and-file employes in the respondent's plant. This being the case we do have a situation here which presents a genuine question of divergent loyalties—the conflict arising from the foreman's duty to his employer to enforce the company rules with respect to subordinate employes and his allegiance to a union allied with one representing the interests of those very subordinates."

## Bretton Woods—Tariff

Following almost immediately approval by the British Parliament of the $4.4 billion U. S. loan and the Bretton Woods Plan, a majority of the participating Nations (not including Russia) signed the Bretton Woods agreement in Washington on December 27.

Meanwhile the United Kingdom, Australia, Canada, South Africa, Brazil, China, the Soviet Union and several more Nations have been extended an invitation by the State Department to participate in a preparatory session for the International Trade Conference which is planned for early next summer. It is announced that the participants are to come prepared to discuss the reciprocal lowering of tariffs. Announcement has been made in a British-American statement that, "These negotiations should get down to cases, seeking to reduce tariffs, to eliminate preferences, and to lighten and remove other barriers to trade, whatever they might be." A preliminary "charter" for the anticipated World Trade Organization includes plans for an industrial and mineral unit which is intended to promote expanded production and trade of fabricated products and minerals.

All of the above indicates rough going ahead for the producers of metals and minerals in need of tariff protection.

## Taxation

It is indicated that work will begin on a tax bill in March or April and that the Committee on Ways and Means will confine its consideration chiefly to repeal of wartime increases in excise tax levies. The Committee Chairman doubts that there will be any reduction in corporation rates during 1946, but has indicated that close study will be given to the operation of cooperative organizations which are now tax free. The Committee plans first to go into a thorough study of the Social Security law to determine the rate of tax required from both employers and employes to provide a sound actuarial basis for 10 years.

## Gold Mine Reinbursement

Hearings were held December 18 and 19 and will continue in January on the bill, H. R. 4393, introduced by Representative Clair Engle of California, to make restitution to gold mine operators for out-of-pocket losses incurred as the result of the WPB shut down order, L-208. Before a War Claims subcommittee made up of Representatives Patterson of California, Bunker of Nevada and Byrnes of Wisconsin, appeared Dr. Wilbur L. Nelson, WPB Mining Division Ad-

ministrator of L-208; Neil O'Donnell, manager, Idaho-Maryland Mines Corporation; David P. Strickler of Colorado Springs, and Julian D. Conover, secretary of The American Mining Congress. Also strongly favoring the bill was Representative Chenoweth of Pueblo, Colo.

Inquiring of the witnesses, Representative Engle built a strong foundation for Congressional consideration of his bill. Basing his question on a WPB report of L-208, only recently made public, Engle drew from Dr. Nelson the conclusion that the order was not justified, had not accomplished its purpose and had worked a serious damage and that the producers should be reimbursed for their losses. The Engle bill was strongly supported by A. M. C. Secretary Conover, who emphasized that all protests by producers and their representatives had been disregarded when the order was issued, October 8, 1942. He stressed the fact that the order was unique, that nothing at all similar has been applied to any other industrial operation. Conover made it clear to the committee and for the record that L-208 constitutes the sole case in which a productive industry was forced by Government edict to cease its operation. He pointed out the distinction between the operation of L-208 and a number of other hardship cases which resulted from the operation of priorities, employment ceilings, or OPA price regulation; thus, he explained to the committee, the Engle bill will in no way set a precedent applicable to any other field because no other industry has thus been singled out and forced by Government fiat to cease operations. The Mining Congress Secretary explained to the committee a number of amendments which it is proposed to add to the bill to definitely clarify its scope and so there will be no question but that the compensation intended is to be only for direct out-of-pocket losses.

## Status of Silver

Treasury authority under the Green Act, to sell silver to manufacturers of flatware, jewelry and other products, terminated with the statutory lapse of the Act December 31. A strong effort made by Senator Green in behalf of the manufacturers of the North Atlantic States to extend the Treasury sales of silver for two years at a price of not less than 71.11c per ounce, resulted only in the passage of his bill by the House, under the sponsorship of minority leader Joe Martin of Massachusetts. In the Senate Committee on Banking and Currency, Senator Green's bill met such determined opposition that further consideration has been deferred until after the Congress reconvenes. Several Senators vigorously contended that the sale price should be $1.29 an ounce (the monetary value), but Senator Wagner, Chairman of the Banking and Currency Committee, has stated that a compromise may be developed at a price of around $1.00 an ounce.

## St. Lawrence Stirs

Hearings are anticipated in February before a five-man Senate Foreign Relations subcommittee on the proposed St. Lawrence Seaway and Power Project. First attention is to be given to the question of whether the St. Lawrence project should be considered as a treaty or an executive agreement. Following the examination of this question the hearing is expected to consider the merits of the project. Subcommittee personnel, as announced by Foreign Relations Committee Chairman Tom Connally of Texas, consists of Senators Hatch, Arizona; Hill, Alabama; Tunnell, Delaware; LaFollette, Wisconsin; and White, Maine.

---

# New Floodlight Application Saves Lives on Coal and Ore Unloaders

By C. H. PEIFFER, Lighting Specialist,
*Westinghouse Elec. Supply Co.*

A NEW method of floodlighting ship loading and unloading operations has greatly increased production and at the same time decreased danger from unseen hazards. For many years the coal and ore industries, in their ship loading and unloading facilities, have had to contend with a very hazardous method of lighting the hold of the ship so that the bridge operator could see to lower his grab bucket into the hold. This method consisted of several portable cords, having three or four 220-volt lamps in series on 600-volt, d-c service. As 90 per cent of all coal rigs are 600-volt, d-c, this was very risky to the men handling them. Not a few were killed from shock while trimming coal from the grab bucket.

By use of a floodlight of 1000 watt size swinging on the end of rig's boom, the light is always over the open hatch of the ship and directed into the hold. This eliminates all portable cords and provides constant illumination without interference to the operator.

A resistor designed for use on 600-volt d-c reduces the voltage to 230 volt d-c at 1000 watts. This consists of six 12 ohm nichrome wire resistors (porcelain base) mounted in a frame. Together with a floodlight with a hinged gasketed cover making it suitable for coalyard service, provides the tools for a new floodlighting application.

1,000-watt incandescent lamps mounted on the end of the rig's boom give the operator this view as he lowers the grab bucket into the hold of this Great Lakes freighter

# The Rocky Road to Dublin

## was a cinch compared to this!

There's no silky six-lane highway where this Mack earns its keep. One of seven Mack Trucks working in the stripping pits of the Coal Rains Coal Company, it leads a rough-and-tumble life.

It's *smash!* . . . as ten tons of coal are dumped into the waiting truck. It's twist and strain and scramble over the ridges and through the ruts. Then 2,000 feet up a steep ramp—two miles more to the breaker. Then back—and over again. Two shifts a day. Six days a week.

Macks show what they're made of on battering jobs like this. They stand up and take it smiling. Why not make your next truck a Mack, and see what performance a really tough truck can deliver?

Mack Trucks, Inc., Empire State Building, New York City. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts.

**Mack**
TRUCKS
FOR EVERY PURPOSE

**Performance Counts!**

# Personals

The appointment of **T. F. McCarthy** as vice president and general manager of the Clearfield Bituminous Coal Corporation was announced on December 17 by W. F. Place, president. Mr. McCarthy will also retain his post as general manager of the coal mining department of the New York Central Railroad Company.

**T. H. O'Brien**, vice president and general manager of Inspiration Consolidated Copper Company, will relinquish his duties as general manager of the Inspiration properties but will remain in an advisory capacity with the title of vice president after January 1, 1946, according to a recent announcement made by **W. D. Thornton**, president. Mr. O'Brien came to Inspiration as general manager in 1920 from the Phelps Dodge Corporation. **P. D. I. Honeyman**, who has held the position of assistant general manager, will succeed Mr. O'Brien as general manager. Mr. Honeyman will be assisted by **H. Carroll Weed** as general superintendent of Inspiration.

**G. R. Spindler**, professor of mining engineering and director of the School of Mines, West Virginia University, has been appointed chief of the West Virginia Mines Department, succeeding Jesse Redyard.

**R. Harry Thomas**, Paintsville, Ky., acting chief of the Kentucky Bureau of Mines and Minerals, has been appointed chief of the department.

**Dr. Richard J. Lund**, mineral economist and geologist and one-time Director of the Miscellaneous Minerals Division of the War Production Board, has joined the staff of Battelle Institute, Columbus, Ohio. According to an announcement by Clyde Williams, Battelle director, Dr. Lund will play a leading role in the Institute's expanding studies of technical-economic problems.

Until recently he was associated with the Reynolds Metals Company as director of basic research.

Dr. Lund was for three years (1937-1940) editor of the *Mining Congress Journal.*

Texas Gulf Sulphur Company announces the appointment of **A. Nelson Myers** to its sales staff as of January 1, 1946, with headquarters at the New York office of the company at 75 East 45th Street. Mr. Myers was formerly connected with the Chilean Nitrate Sales Corporation.

After serving five years in the Army, **Lt. Colonel Harry L. Moffett** has returned to the American Mining Congress where he will serve on its staff and that of THE MINING CONGRESS JOURNAL.

During the war his assignments

included duty with the supply division of the War Department General Staff, with the Headquarters of the Services of Supply, and with the Office of the Quartermaster General. While on duty with the last-named headquarters he directed the public relations policies for the entire Quartermaster Corps, U. S. Army and served as Executive Officer to the Quartermaster General.

During his tour of duty he visited most of the theaters of operation as aide to the Quartermaster General.

For meritorious performance of duty reflecting credit upon the Army, he was presented with the Legion of Merit decoration by Lt. General E. B. Gregory. He also holds the Army Commendation award.

**Dr. Ben H. Parker**, vice president of the Frontier Refining Company for the past two years and prominent in mining and industry circles in Colorado and the West, has been named president of the Colorado School of Mines to succeed Dr. M. F. Coolbaugh, whose retirement was announced in October. Dr. Parker assumed his new duties as president of the school on January 1.

Effective January 1, 1946, the following changes in administration are announced by **Eugene McAuliffe**, Chairman, Board of Trustees of the Union Pacific Coal Company:

The office of President **I. N. Bayless** will be moved from Rock Springs, Wyo., to the Union Pacific Building, Omaha, Nebr.

**H. C. Livingston** will assume the duties of Vice President-Operation, with offices at Rock Springs, Wyo. The position of Assistant General Manager, now held by Mr. Livingston, will be abolished.

**V. O. Murray** is appointed General Manager, with offices at Rock Springs, Wyo. The position of Assistant General Manager, now held by Mr. Murray, will be abolished.

**J. B. Hughes** is appointed General Superintendent, with offices in Rock Springs, Wyo.

**William Wraith**, associated with Anaconda Copper Mining Company since 1897, retired December 31. Mr. Wraith was vice president and director of Andes Copper Mining Company, Chile Copper Company and Greene Cananea Copper Company, all Anaconda subsidiaries. He was also vice president and director of Inspiration Consolidated Copper Company. Mr. Wraith was tendered a testimonial dinner on Monday evening, December 17, at the Waldorf Astoria Hotel, New York, by Anaconda officials as well as officers of the companies with which he was connected.

**W. G. Giddings**, for many years general auditor of the Island Creek Coal Company, has resigned to accept a position with the Raytheon Manufacturing Company of Boston, Mass.

**Albert H. Charlton** has been named sales manager of the Aluminum Division of the Reynolds Metals Company with headquarters in Louisville, Ky., it was announced by David P. Reynolds, vice president, recently.

**R. R. Estill**, formerly Assistant General Superintendent, U. S. Coal & Coke Company, at Lynch, Ky., was appointed Combustion Engineer for the H. C. Frick Coke Company, the United States Coal & Coke Company, and their associated companies, succeeding **W. E. Housman**, retired, according to an announcement of **K. L. Konnerth**, Assistant to President, Engineering. Simultaneously, announcement was made by **Clifford G. Strote**, Purchasing Agent, of the appointment of **Stanley Witt** as Assistant Purchasing Agent for these companies, succeeding **M. S. Mawhinney**, retired. Both appointments were effective January 1, 1946.

**Lt. Col. J. Alden Bowers** has been named chief of the Solid Fuels Branch, Fuels and Lubricants Division, Office of The Quartermaster General, succeeding Lt. Col. Carleton R. Mabley who recently was released from active duty to return to the Island Creek Coal Co., Huntington, W. Va.

A graduate mining engineer of the University of Utah, Colonel Bowers was a reserve officer when called to active service as a Captain in the field artillery. He was promoted to Major in May, 1943, and was detailed to the Fuels and Lubricants Division, Office of The Quartermaster General, in December, 1943.

The Solid Fuels Branch of the Office of The Quartermaster General exercises staff supervision over the procurement of all solid fuels for the armed forces. Before becoming chief of the branch, Colonel Bowers was head of the Plans Section, which supervises activities in connection with coal mining problems outside of the United States, including the rehabilitation of mines in liberated and occupied countries.

**A. Lee Taylor, Jr.**, has resigned as mine geologist, U. S. Smelting, Refining & Mining Company, Salt Lake City, Utah, and **Sanford R. Knapp** has resigned his position as director of material supply for the British Air Commission, New York City, to devote their entire time to the business of the Taylor-Knapp Co., which for the past 10 years has been interested in various mining operations in Montana. The Taylor-Knapp Company recently acquired the entire holdings of the Moorlight Mining Company at Phillipsburg, Mont., outstanding for its production of battery manganese ores.

**Lt. Commander Anthony Anable**, U. S. Naval Reserve, now on terminal leave, will rejoin the Dorr Company, engineers of New York on January 1, as director of public relations and advertising. Commander Anable has been on military leave from the Dorr Company since shortly after Pearl Harbor.

**H. P. McDermott**, associated with the Philadelphia & Reading Coal & Iron Company for the past 40 years, has been elected vice president. Howard Price, secretary to the president for the past 10 years has been elected secretary of the company. William G. Fitzpatrick succeeds Mr. Price as secretary to the president.

**George Lyle Addy** has been named superintendent at the D. O. Clark Mine of the Union Pacific Coal Company, Superior, Wyo. He succeeds George A. Brown, who is retiring after 40 years' association with the company.

**A. Y. Peterson** and **Guy B. Diehl** retired from their official duties as vice presidents of the Oliver Iron Mining Company on December 31, according to announcement from **LeRoy Salsich**, president.

Mr. Peterson, for many years vice president in charge of operations, joined the company in 1901 as mining engineer. He became vice president and general manager in 1930.

Mr. Diehl became associated with the company in 1902 immediately after his graduation from the University of Wisconsin, and was elected vice president in charge of mining engineering in 1936.

**Dr. John G. Dean** is now with the Development and Research Division of The International Nickel Company, Inc., 67 Wall Street, New York, N. Y., as Senior Fellow-in-Absentia of Mellon Institute of Industrial Research, Pittsburgh, Pa.

**David W. Jones** has been appointed general manager of the Simpson Creek Collieries Company which operates in Barber and Harrison Counties, West Virginia. Mr. Jones was formerly consulting engineer on the staff of Paul Weir, Chicago.

**Myron L. Trilsch**, deputy director of the Tin, Lead, Zinc Division of the CPA, has terminated his service with that agency and joined the sales staff of the American Metal Co., Ltd.

**Clyde A. Pippen** of Birmingham, Ala., has been elected secretary-treasurer of the Alabama Mining Institute, to fill the vacancy occasioned by the death of H. E. Mills. Mr. Pippen was recently released from the Navy, where he had served as a Senior Lieutenant.

**Charles Will Wright**, who for many years has been engaged in studies of foreign mineral resources for the Bureau of Mines and the Foreign Economic Administration, has severed his connection with the Government to accept a position with Ventures, Ltd.

**D. A. Stewart**, who has been engineer in charge of the Sunset Mineral Company's Liberal King mine and mill on Pine Creek, has resigned his position to accept the management of a gold property near Nome, Alaska. **J. C. Keiffer**, of Osburn, succeeds him as manager for Sunset Minerals.

**Frank E. Nutt** has been named Assistant Sales Manager of the Crocker-Wheeler Electric Manufacturing Company, Division of Joshua Hendy Iron Works at Ampere, N. J. He was replaced at his former post as manager of the company's Washington, D. C., office by **A. M. R. Lawrence** of Chevy Chase, Md.

**H. A. Berg**, president of The Woodwood Iron Co., announces the appointment of **H. A. Byrnes** as general superintendent of coke ovens, blast furnaces and transportation, and **Hewitt Smith** as general superintendent of mines. Mr. Byrnes comes to Woodward from the American Steel & Wire Co., at Cleveland, Ohio. Mr. Smith, who has been with the company for a number of years, advances from the position of assistant general superintendent.

The retirement of **P. C. Kaiser** as manager of the Repauno Works of the du Pont Company and the appointment of **J. W. Kitts**, production manager of the Military Explosives Division, as his successor was announced December 28. Both changes are effective January 1.

Mr. Kaiser has been manager of the du Pont commercial explosives plant at Gibbstown, N. J., since 1929 and has been with the company since 1911. He is retiring for reasons of health.

Mr. Kitts has been with du Pont since 1916, joining the company upon graduating from the University of Pennsylvania. He is a native of Media, Pa.

Announcement has been made of the incorporation of **Peter F. Loftus**, Consulting Engineers, as Peter F. Loftus Corporation, effective January 1, 1946. Offices are in the Oliver Building, Pittsburgh, Pa.

**Rufus Bailey**, formerly district mine inspector for the Kentucky State Department of Mines has left that post and assumed the position of Superintendent and General Manager of the R. C. Tway Coal Company, Harlan, Ky.

## — *Obituaries* —

**William Arthur Butchart**, inventor and manufacturer of ore-dressing machinery and equipment, died November 25 at Rogers, Ark. He lived for many years in Joplin, Mo., and the concentrating tables, flotation machines and other equipment which he designed were important factors in the improvement of milling practices in the Tri-State district.

**Thomas A. Colwing**, sales manager and director of E. J. Longyear Company for the last 25 years, passed away in Minneapolis on January 4, 1946. He had been associated with the company for 37 years and was well known in mining circles.

**James H. Rowe**, 71, died suddenly in Butte, Mont., on December 2, 1945. He was a director of the North Butte Mining Company, a member of the Mining Association of Montana, and an outstanding civic leader of the state.

**George B. Conway**, 85, pioneer mining man of Beaverhead County and Helena, died in Dillon, Mont., on November 4.

## R. G. HALL

***An Appreciation, by Worthen Bradley***

**Robert George Hall**, metallurgist of the Bradley Mining Co., was killed in a highway collison on November 25, 1945 near Hollister Calif., as he was returning from a trip to the El Segundo antimony plant of The Harshaw Chemical Company.

Mr. Hall was born in Hilltown, County Down, Ireland, on February 6, 1871. He entered the United States at the age of 18, working for a few years in Pittsburgh to accumulate funds for a college education, before enrolling in the Massachusetts Institute of Technology in 1893 to study a combination of chemistry and mining which became the basis of the metallurgical course. Upon graduation with the class of 1897 Hall went to Colorado as a chemist with

the Pueblo Smelting & Refining Co. Then followed experience in the metallurgy of gold in the San Juan and Cripple Creek fields, during that interesting period marked by the displacement of chlorination by cyaniding. Hall's responsibilities included the management of properties: that of the American Gold Mining Co. at Ouray, and others.

In 1900 he married Josephine Thompson in Pueblo. They have had two sons.

In 1905 he became assistant superintendent and later general manager of the United Zinc and Chemical Co. Hall installed the second retort in the United States for treating high-iron zinc ores (the first had been put in by the U. S. Zinc Co., and was modeled after Belgian practice, and also built a smelter at Springfield, Ill., for United Zinc.

From 1913 on Hall worked out of St. Louis for the American Smelting & Refining Co., operating plants in Keokuk, Iowa, and Florence, Colo., and continuing research on complex western ores and the production of electrolytic zinc. In 1918 he was appointed to one of the premier positions of his profession: resident manager of the famous Bawdin Mine of the Burma Corporation, Ltd. There with his staff he developed a successful metallurgical process, making lead-silver and zinc concentrates from complex low-grade ores, and smelting the former concentrate with the high-grade ore. Returning to this country in 1921 he settled in San Francisco, subsequently worked for D. C. Jackling on a zinc smelter near Redding. He later engaged in construction work in San Francisco.

Returning to the mining field in 1927, he became associated as metallurgical consultant with F. W. and P. R. Bradley, on work for their Alaska Juneau and Atolia enterprises. He continued in that capacity for the Bradley Mining Co., and in recent years specialized in laboratory and office research on tungsten, antimony and quicksilver. He was the author of many papers on these subjects, and his 1945 review of the antimony industry will appear in the February issue of MINING CONGRESS JOURNAL.

R. G. Hall became intensely preoccupied with any task he undertook, and was never content with any result short of his best. In spite of this serious aspect of his nature, he always had time for geniality and thoughtfulness toward his associates.

Mr. Hall's valuable work will be missed, but more than that, it will be remembered that he had personality and integrity to match his learning and ability.

## *EDITOR DIES*

DR. STANLEY A. TRENGOVE, 47, Editor of Mining Congress Journal, died on December 28 in Washington, D. C., after a very brief illness.

Dr. Trengove had been editor since March 1, 1944. Previously he had been Chairman of the Department of Mining Engineering, Missouri School of Mines, Rolla, Mo., for three years. Prior to that time he had served as production engineer and later as assistant district superintendent for the Oliver Iron Mining Company on the Mesabi Range of Minnesota. Dr. Trengove had done extensive work in connection with mine valuations, operation of underground and open pit mines, ore dressing and metallurgical problems for various mining and manufacturing companies, and had made special studies of coal, zinc and lead, bauxite and other properties in the central and southwestern states. He was for several years on the faculty of the Minnesota School of Mines and Metallurgy, and was the author of various papers on mining practice and advances in mining technology, drilling and blasting, mechanical loading and haulage, ventilation, mine safety and other subjects. He was one of the pioneers in the introduction of trucks and conveyor belts in open-cut iron mining.

Born at Tower, Minn., Dr. Trengove entered college after serving two years with the U. S. Army in New Mexico and France during World War I, and received his E.M. degree from the Minnesota School of Mines and Metallurgy in 1928. He received his Doctor of Philosophy Degree in 1934 from the University of Minnesota, majoring in economic geology.

He was a member of Tau Beta Pi, Sigma Xi, American Institute of Mining and Metallurgical Engineers, and the Missouri Society of Professional Engineers.

Dr. Trengove is survived by Mrs. Trengove; a son, Harvey Charles; a daughter, Mrs. Eugene Mackin; and a granddaughter. Burial was at Virginia, Minn.

*A seven-foot fracture in this 6-ton press column threatened a serious delay in production. Tobin Bronze* repair welded, the column was ready for assembly in three days.*
(*Reg. U. S. Pat. Off.

# Bronze Repair Welding becomes increasingly important

WITH REPLACEMENTS taking weeks or months, Bronze repair welding is being used on an ever-increasing scale for reclaiming broken, fractured or worn equipment.

Bronze welding is not new. For years this method of low-temperature repair welding has been used by many shops to salvage costly machine tools, production parts and equipment, and for building up worn surfaces.

Almost any part made of cast iron, steel, malleable iron or copper alloys can be Bronze welded quickly, dependably, and at a fraction of the cost of new replacement parts. For detailed information on Anaconda Bronze Welding Rods, write for Publication B-13. 45105

ANACONDA

## *Anaconda Bronze Welding Rods*

THE AMERICAN BRASS COMPANY—General Offices: Waterbury 88, Connecticut

*Subsidiary of Anaconda Copper Mining Company • In Canada:* ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

# NEWS and VIEWS

Charles Morris, (right) sectional foreman, the Hudson Coal Company, receives safety award from Pennsylvania's Governor Martin while Secretary of Mines, Richard Maize, looks on. (See story below)

## Eastern States

### Governor Martin Rewards Mine Official

In recognition of outstanding safety achievements, Governor Edward Martin of Pennsylvania recently presented to Charles Morris, assistant mine foreman, Olyphant Colliery, The Hudson Coal Company, Scranton, Pa., an approved type of miner's flame safety lamp, inscribed as follows:

"Presented By
Governor Edward Martin
To
Charles Morris, Assistant Foreman,
in recognition of an outstanding safety record established in Miles Slope, Hudson Coal Company.
He supervised the production of 1,160,490 tons of coal without a roof fall injury.
November 15, 1945."

The recipient of this award, Mr. Charles Morris, has spent 40 years of his life as an employe of The Hudson Coal Company, having started as a breaker boy at the age of 12 years. He has been an assistant mine foreman in the Miles Slope of the Olyphant Colliery of the Hudson Coal Company from March, 1925, to present time, slightly over 20 years. During this period he supervised the work of 60 men in his section, who have produced 1,160,490 tons of coal without a single roof fall injury. This is a remarkable and outstanding record when one considers that the average production per roof fall injury is approximately 80,000 tons.

The record attained by Mr. Morris has been in a section of the mine where the roof conditions are such that they require careful attention. Mr. Morris developed the practice of having the miners immediately examine their roofs when an assistant mine foreman walked into the place. The miners were also trained by him to examine the roof frequently during the course of the day.

Mr. Morris was the first assistant mine foreman employed by The Hudson Coal Company to have all the men under his jurisdiction fully equipped with hard hats, goggles and safety shoes.

During the past 10 years Morris has received four Certificates of Honor from the Joseph A. Holmes Safety Association for outstanding safety records.

### Industrial Hygiene Foundation Given Navy Award

The Navy's recently created Certificate of Achievement has been awarded to Industrial Hygiene Foundation at Mellon Institute, Pittsburgh, for "the splendid efforts put forth by the staff of your organization in support of the war production program."

Captain Ernest W. Brown, (MC) Director of Industrial Hygiene Research, Bureau of Medicine and Surgery, Navy Department, presented the certificate at the opening of the foundation's tenth annual meeting of member companies held recently at Mellon Institute. Captain Brown said in part:

"Your ability as an organization to advance industrial health has been attained by the excellence of your surveys of occupational hazards, thereby improving working conditions in war plants; by studies of health conditions of women in industry—a new problem; and by your important publications, notably the Industrial Hygiene Digest—the only journal of its kind."

The certificate is given for production achievement or services rendered. The foundation, an association of industrial concerns, received the award on the latter basis.

### Pittsburgh Consolidation Coal Company

THE new Pittsburgh Consolidation Coal Company was organized recently at a meeting of its 15-man Board of Directors, headed by Robert C. Hill, chairman, of New York, and George H. Love, of Pittsburgh, president.

A. K. Oliver, of Pittsburgh, was named chairman of the finance committee; James B. Morrow, Pittsburgh, first vice president; George W. Kratz, vice president, and C. E. Beachley, secretary and treasurer.

"The bituminous coal industry has suffered from declining markets due to the invasion of competitive fuels for a number of years," said Mr. Love in explaining details of the deal. "The spirit and aims behind this

merger is to have strong, well financed, aggressive units which will fight to restore coal as an undisputed primary source of energy.

"Coal still is our most abundant natural resource, and we will concentrate in Pittsburgh Consolidation on an intense modernization, mechanization, research and promotion program to make a maximum use of it. This program is now under way in the large northern West Virginia properties.

"The merger has placed us in an excellent overall position to follow up such a program. It has created the largest commercial producer in our industry and provided a simplified capital structure with ample working funds."

Pittsburgh Consolidation becomes the nation's largest commercial producer of bituminous coal. It has assets of more than $100,000,000 with a net working capital of approximately $29,000,000 after making liberal allowance for objecting Pittsburgh preferred stockholders accepting the cash offer of $100 a share.

The company has 43 mines in Pennsylvania, West Virginia, and Kentucky, approximately 1,300,000,000 tons of unmined coal, 16,000 employes and a current production rate of 20,000,000 tons annually, with lessees producing an additional 6,000,000 tons.

Two wholly owned subsidiaries have been organized to operate the properties formerly held by Pittsburgh and Consolidation. Mr. Morrow will be president of the new Pittsburgh Coal Company and will have complete responsibility for the operations of all of his old company's properties. This concern will continue with the present personnel and will maintain its headquarters in the Oliver Building. His company will have approximately 115,000 acres of land with an estimated 775,000,000 tons of unmined coal.

The new Consolidation Coal Company will operate the former properties of the old one with the same management and personnel. It will have approximately 113,000 acres of land and about 600,000,000 tons of unmined coal. Headquarters will for the present be maintained in the Koppers Building in Pittsburgh.

The combined Pittsburgh and Consolidation Companies had assets of approximately $162,000,000. However, the plan of merger empowered the new Board to create a reserve to reduce the carrying values of the properties. Mr. Love said immediate consideration was being given to this problem and that present estimates indicated the reserve might not exceed $62,000,000, which would give the new company assets roughly of $100,000,000.

Pittsburgh Consolidation has extensive investments in companies operating in the various fields associated with coal production, such as railroads, river and lake transportation, merchandising and extensive dock facilities on the Great Lakes. No change is being made in the management or personnel of these subsidiaries, Mr. Love said.

## First Aid Originated at an Anthracite Colliery

October 25 marked the 46th anniversary of the founding of First Aid in America, at Jermyn Colliery of the Hudson Coal Company. Under the inspiration and leadership of Dr. Matthew J. Shields, a group of Cornish and Welsh miners got together at that time to study first aid as a way to minimize the suffering of injured fellow workers. This was the first class in first aid for laymen ever held in the United States and it marked the beginning of the vast national program of first aid training which is sponsored in the mining industry by the Bureau of Mines and in other industries by the American Red Cross.

The movement spread so rapidly that by the time of his death in 1939, Dr. Shields had seen nearly two million people trained and certified by the Red Cross in first aid. This number has since grown to nine million and more than two million have been trained by the Bureau of Mines.

## DeBardeleben Expands By-Products Department

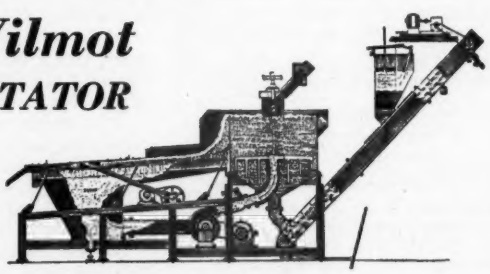
The DeBardeleben Coal Corporation has purchased the old Holt blast furnace from the Tennessee Coal, Iron & R. R. Co., and sold it to Charles Temerson & Sons for dismantling and scrapping. The old furnace, located near Tuscaloosa, was out of date and has been down for quite a while. Part of the site will be used by National Southern Products Corporation for erecting a modern, up-to-date chemical plant, another part of the site was acquired by the Gulf, Mobile and Northern Railroad, for industrial sites, while the remainder of the 51 acres will be used by the DeBardeleben Corporation for expansion of its by-products department.

* * *

On account of the shortage of workers for the iron ore mines in the


NEW AUTOMATIC CONTROL of COAL CLEANING

With the Wilmot HYDROTATOR



Now, as a result of recent engineering developments, Wilmot Hydrotators afford a higher degree of automatic control that adds still more efficiency to the Hydrotator principle. Consider the higher efficiency and greater capacity of Hydrotators in planning for peacetime production.

Wilmot Builds Better Breakers

WILMOT
A GREAT NAME IN THE COAL INDUSTRY

Write for Hydrotator Bulletin HR

HYDROTATOR Preparation EQUIPMENT

WILMOT ENGINEERING COMPANY, HAZLETON, PA.

Birmingham district, the Tennessee Coal, Iron & R. R. Co., has recently had to have ore shipped in from another state. This is the first time in its history that the T. C. I. has had to go outside the district for ore. Inability to secure the needed workers for its Red Mountain mines was the cause reported.

## Steel Production Anniversary

On November 30, 1945, the 46th anniversary of steel production in Alabama was celebrated. It was on Thanksgiving Day, in 1899, that the first ladle of steel was poured from the then new furnaces at Ensley and a new era for the district was begun. The city of Birmingham was only 28 years old then, but it was going strong, and this event boosted things greatly.

Today, with an estimated population of over 300,000, it is the youngest city in America in its population class. The indications are that it is on the threshold of a new era of development and progress that will strengthen its title to the designation of "The Magic City," because of its unique position as regards its mineral resources.

Here, in the immediate vicinity of its furnaces, is sufficient iron ore to run its present 24 pig-iron furnaces 330 years. There is an estimated 1,700,000,000 tons of red ore and 27,000,000 tons of brown ore, with all the coal and fluxing materials needed to convert this into pig-iron. Of the 4,000,000 tons of pig-iron produced annually in Alabama, approximately 3,000,000 tons is produced in the Birmingham district.

There are more than 200 coal mines in Alabama, employing some 25,000 miners and producing more than 22,000,000 tons of bituminous coal, yearly. There are 35 coal washers, handling 40,000 tons daily, preparing it for the coke ovens. There are over 1,000 by-product coke ovens which produce more than 5,500,000 tons of coke yearly. The principle by-products are light oil, creosote oil and pitch. Great quantities of benzol and coal tar are produced from these. Alabama stands seventh in the list of coal producing states of the nation.

**FOR SALE: 300 All Steel Mine Cars 42" gauge, 16-inch chilled cast iron wheels, Timken bearings, 4-ton capacity—in good condition—can be used for either Rotary Dump or Cross-Over End Dump.**

HANNA COAL CO.
ST. CLAIRSVILLE, OHIO

## Weekly Festivals Resumed

Weekly song festivals for the children of miners in communities of the Koppers Coal Division, Eastern Gas and Fuel Associates, have just been resumed for the second season, according to Thomas E. Lightfoot, director of welfare.

The program was initiated last winter in the Keystone mining community under the direction of Elsie Brenaman, in charge of singing at Camp Thomas E. Lightfoot, summer recreation camp operated by Koppers Coal for the children of its mine employes. At the opening of the second season recently more than 200 children, as well as a number of adults, attended. Gatherings are held each Friday evening in the community hall.

Success of the project at Keystone has encouraged the establishment of similar weekly meetings at Kopperston under the direction of Mrs. Harry L. Poe, wife of the pastor of the Kopperston community church. The meetings are held in the basement of the church on Sunday evenings.

Plans are nearing completion for extension of the program to the Wharton and Carswell mining communities and to the other Koppers Coal communities in West Virginia, Pennsylvania, and Kentucky, Mr. Lightfoot states.

## Atomic Power Versus Coal

Industrial atomic power will be decades away if its economic use is predicated on coal at $15 a ton, which is over two and one-half times the present wartime national average of under $6 a ton for steam or power coal, the Bituminous Coal Institute has stated, in answer to opinions expressed by atomic experts recently in New York City.

The question relating to the time necessary to develop atomic competition to $15 coal was asked by Dr. James B. Conant, president of Harvard University. Various experts replied that such competition might become economically practicable in anywhere from three to 25 years. When the conclusions were brought to the attention of James D. Francis, president of Island Creek and other coal companies, Mr. Francis said:

"In view of the excessive coal cost quoted in the atomic discussions, it would appear to me that it will not be three years or 25 years, but some-

I-T-E sectionalizing circuit breakers . . .

REDUCE FIRE HAZARDS

By interrupting overload currents which can anneal trolley wires without opening a substation circuit breaker set to trip at a high current value, I-T-E Sectionalizing Circuit Breakers strike at major causes of mine fires.
Investigate this protection which can pay returns far in excess of the original cost.
Write for I-T-E Bulletin 2502. I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Philadelphia 30, Pa.

I-T-E AIR SWITCHGEAR
*Representatives in Principal Mining Areas*

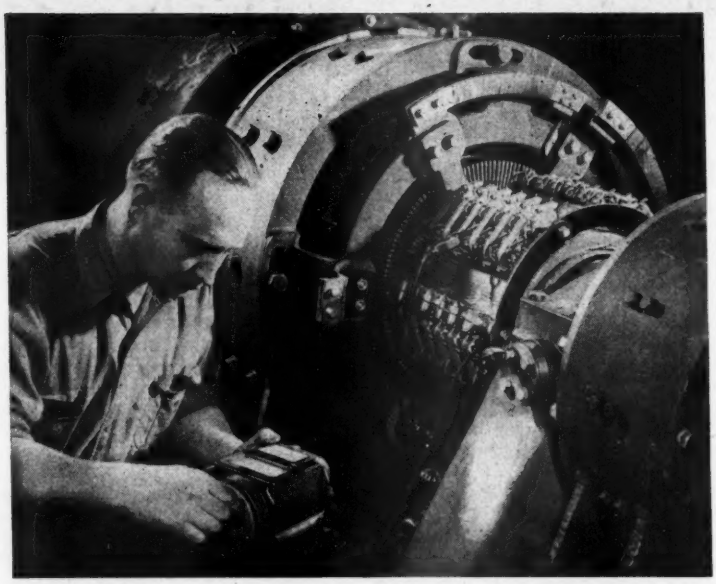
thing like two or three generations before bituminous coal has anything to fear from atomic energy."

Bituminous steam coal which is the country's greatest source of power is now being delivered to the power producers at a national average price of less than $6 a ton, the Institute pointed out. At the mine the selling price averages approximately three dollars a ton.

In several instances electric power plants are located at the mines or even on top of the mine, and the cost of these plants is three dollars a ton or less.

Another thing to be kept in mind is the increasing economy that has been effected, and continues to be effected, in producing electric energy from coal. In 1920 it took on the average 3.39 pounds of coal to produce a kilowatt hour of electricity. In 1944 the consumption had been reduced to 1.30 pounds per kilowatt hour and many modern plants are today using only approximately three-fourths of a pound of coal for each kilowatt hour produced.

"By and large," Mr. Francis added, "bituminous coal has long been the cheapest means of producing power, and will continue so to be for a long time in the future. Any discussion of possible future competition from atomic energy should be based on a recognition of actual market prices for coal. For in view of the fact that we must compete with natural gas and petroleum products, coal will continue to be sold at a low competitive figure."



Measuring insulation resistance—an important part of a preventive maintenance program. Since electrical insulating materials are non-conductors only when dry and clean, it is important to keep all equipment free from accumulations of dust and dirt—which not only contribute to insulation breakdown, but operate to increase the motor temperature through restrictions of ventilation

## "Tin From Bolivia" Sound Film Now Available

"TIN FROM BOLIVIA," the first sound motion picture film of the Bureau of Mines photographed largely in another country, was released recently for free showing to schools and colleges, industrial and vocational training groups, the armed services, business and civic clubs, and other organizations.

"This new picture brings to the screen the intensely interesting story of the production of tin, one of the few important metals that is not mined in the United States," Dr. R. R. Sayers, director of the bureau, stated.

Produced in cooperation with the largest tin mining company in Bolivia, the newest addition to the bureau's extensive library of films for free public showing is in 16 millimeter sound and covers nearly every phase of the mining, milling, smelting, and refining of tin. With a running time of 22 minutes, the film's brevity and excellent photography, together with its non-technical script, make it eminently suitable for telling the story of one of the most essential metals of modern civilization.

Applications for free short-term loans of the film, "Tin From Bolovia," should be addressed to the Graphic Services Section, Bureau of Mines Experiment Station, 4800 Forbes Street, Pittsburgh 13, Pa., and should state specifically that the borrower is equipped to show 16-millimeter sound films. No charge is made for use of the film but the exhibitor is expected to pay transportation charges and for loss or damage other than normal wear.


**Industrial Safety Service**
Coal Mining
Consulting Safety Engineer
*Management-Labor Relations*
Telephone 62-189
30½ Capitol St. Charleston, W. Va.
P. O. Box 546

**PETER F. LOFTUS**
*Consulting Engineers*
ENGINEERING AND ECONOMIC SURVEYS, ANALYSES AND REPORTS ON POWER APPLICATIONS AND POWER COST PROBLEMS OF THE COAL MINING INDUSTRY
Oliver Building Pittsburgh, Pa.

**F. CARL COLCORD**
*Consulting Engineer*
Coal land valuations, Mine installation and operation
1132 Union Trust Bldg. Cincinnati, Ohio Phone Cherry 5403
Box 268 Paris, Ky. Phone 643

**P. R. PAULICK**
*Consulting Mechanization Engineer*
Specializing Exclusively in Practical Engineering Application of Fundamental Mine Mechanization Principles; Selection of Proper Equipment; Correct Engineering Planning; Proper Installation; and Efficient Operation.
South Park Road, Library, Pa.

**L. E. YOUNG**
*Consulting Engineer*
Mine Mechanization
Mine Management
Oliver Building Pittsburgh, Pa.

**MARSHALL HANEY, Ph.D.**
*Consulting Mining Engineer*
Examinations Reports Appraisals
Princess Anne Hotel
Fredericksburg, Va.

# Central States

## Operators Launch Aluminum Therapy Programs

An aluminum therapy program to alleviate silicosis hazards is being sponsored by district mining companies throughout the Tri-State Zinc and Lead Ore Producers Association. The program has been inaugurated at the Picher Hospital under the direction of Dr. M. A. Connell, who is in charge of the medical control phase of the work.

The aluminum therapy program is the essential culmination of years of experience of McIntyre Research, Limited, a non-profit organization of Toronto, Canada. It has been definitely established that the inhalation of small quantities of aluminum powder inhibits the pathologic reaction of siliceous dusts in the lungs through preventing or arresting its action.

As the program expanded in Canada, considerable interest for it developed in this country and a few years later, Dr. J. W. G. Hannon was appointed United States Director of the program. Regular treatments under the supervision of a qualified physician are given and the recipient is required to inhale a specially prepared aluminum powder for a specific period at regular intervals. Only aluminum of unusually high purity is permitted in the treatment.

The aluminm powder treatment is reported to be an adjunct to engineering control of industrial dust and can only be used in conjunction with a dust-control program. It is regarded as one more scientific advancement in the control of an industrial hazard. The program, together with present dust-control practices in the Tri-State mining industry should alleviate a hazard which has been associated with mining operations in the past. F. F. Netzeband of the Ore Producers Association is in charge of the engineering and dust-control phases of the program.

## Lawyers Lead and Zinc Properties Sold

The entire holdings and properties of the Lawyers Lead and Zinc Company in the southeast part of the Picher mining field have been sold to the Marcia K. Mining Company, Inc., which took over operation of the properties the first of the year. The purchasing company is headed by Claude Jones of Miami, Okla., who is also vice president and general manager of the Davis-Big Chief Mining Company, operating the old Skelton mines and other properties in the Picher field. Other officers are Floyd L. Bumgarner of Joplin, Missouri, vice president, and Louis J. Bowers of Picher and Miami, secretary-treasurer. The new company is expected to expand operations and increase the output in the near future.

Sale of the Lawyers holdings marks the retirement of George O. Pearson of Joplin, one of the many successful operators in the history of the Tri-State district. He began his career in the Joplin district more than 50 years ago and is recognized as one of the outstanding independent operators of the local mining field.

## Indiana Coal Laboratory Established

A new laboratory in Terre Haute, furnished with all modern testing and analytical equipment designed for making analyses and various tests of coals produced in the State of Indiana, has been established by the Coal Trade Association of Indiana. The laboratory will serve all members of the coal operators' organizations who produce over 90 per cent of the state's tonnage which last year amounted to 27 million tons.

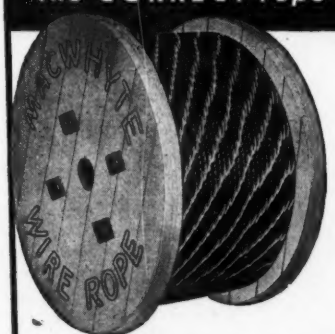
"Indiana coal-producing companies have a well-earned reputation as being leaders in the nation's coal industry in the preparation of coal for all uses and the establishment of this new modern coal laboratory is just another step on the part of these operators to keep ahead in the field of coal preparation," stated C. C. Lydick, managing director of the association, in opening the new laboratory.

In its work the laboratory will be able to determine the analyses of coals including moisture, ash, sulphur, fixed carbon, volatile matter, and the heating value of coals in BTU's. It will also have facilities for determining the fusion temperatures of ash and the grindability characteristics of coals. Facilities are also available to make other studies required to determine the best means to produce the highest quality coals. Being located at a point easily accessible to the producing plants, the laboratory can perform its services immediately and promptly report to operating personnel who, in turn, will be in a position to closer control quality and consistently produce a bettered product.

Henry O. Erb, preparation engineer of the Coal Trade Association, is also director of the new laboratory. As engineer, Mr. Erb serves the members of the association on all questions of modern preparation methods at the various plants operated at the mines.

"The combination of coal preparation engineering field service coupled


The CORRECT rope for your mining equipment




MACWHYTE
PREformed

- Internally lubricated
- Made from special steels
- Made by craftsmen with years of experience
- PREformed for longer, low-cost service

734-H

MONARCH Whyte Strand PREformed... Macwhyte's best grade wire rope... famous for its strength, toughness, and internal lubrication.

Request Catalog on your company letterhead!

170 pages of information. A request on your company letterhead will bring it to you promptly. Ask for Catalog G-15.

MACWHYTE COMPANY
2932 Fourteenth Ave., Kenosha, Wisconsin

Manufacturers of MACWHYTE PREformed and Internally Lubricated Wire Rope... MONARCH WHYTE STRAND Wire Rope... MACWHYTE Elevator Wire Ropes... MACWHYTE Braided Wire Rope Slings... MACWHYTE Aircraft Cables and Tie Rods

Mill Depots: New York, Pittsburgh, Chicago, Ft. Worth, Portland, Seattle, San Francisco
Distributors throughout the U.S.A.

with prompt laboratory analysis is unique," stated Mr. Lydick. "Adverse conditions ascertained through laboratory analyses of coal may be promptly corrected by preparation engineers of the producing company who may call upon the preparation engineer of the Coal Trade Association for assistance if desired."

Analytical work in the new laboratory is to be performed by, and under the immediate direction of, John M. Sanford, a graduate chemical engineer of Rose Polytechnic Institute, and for years a resident of Terre Haute. Mr. Sanford formerly conducted his own laboratory in this city and only recently received his honorable discharge from the United States Army.

## Wash House Space Requirements Eased

State Attorney General George F. Barrett of Illinois has recently issued a supplemental opinion on wash houses at coal mines in which he states that the space occupied by fixed seats or benches is to be included in computing the seven square feet of floor space per man. This ruling reverses a previous stand in which it was stated that areas of wash rooms obstructed by benches and other facilities could not be included in computing the minimum seven square feet per man required under a state act.

Reason for the reversal of opinion, the attorney general declared, came as a result of an investigation which showed that seats in wash rooms were in many cases of fixed construction and are readily used as floor space by miners and are desired by them as a matter of convenience.

## New Research Department Announced

Establishment of a new department by The M. A. Hanna Company to conduct technological research in coal and other industrial lines in which the company is interested was announced recently.

The new department is intended to provide research service for Hanna customers and also to supplement the work of existing coal research organizations, Vice President James Prendergast said. It will be concerned not only with the technical problems of coal users, but also with the development and advancement of the use of coal-derived hydrocarbons by the chemical, plastic, and other industries.

George D. Creelman, administrative assistant at the Institute of Gas Technology, Chicago, will direct the research department, assuming his new duties January 2. Mr. Creelman, a graduate of Harvard in 1931, for 11 years was associated with the M. W. Kellogg Co. of New York, chemical engineers, where he worked on pilot plant and refinery operation and on engineering patent development. He later became research engineer for the Monsanto Chemical Co. of St. Louis and joined the Gas Institute in October, 1944.

Geo. D. Creelman

The Hanna research department has also engaged Frank A. Howard of New York, formerly president of the Standard Oil Co. of New Jersey Development Corporation, who will serve in a consulting capacity.

## Over-Fire Steam Jets Eliminate Smoke

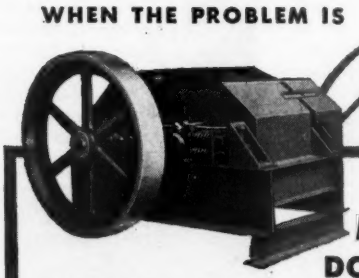
A simplet twist of the wrist is all it takes to reduce dense black smoke to an almost invisible haze, when a railroad locomotive is equipped with modern steam-air jets that furnish extra air over the fire to quicken combustion of volatile matter from coal, Bituminous Coal Research, Inc., the research agency of the bituminous coal industry, reports.

The report from the agency also stated that two dozen railroads, including many of the major lines of the country, have equipped 666 engines with jets and silencers patterned after the BCR jet design.

This appliance was developed for the research agency by Battelle Memorial Institute, Columbus, Ohio, one of three laboratories in which the bituminous coal industry is carrying on extensive research. Four railroads serving the Ohio city—B. & O., C. & O., N. & W., and Pennsylvania—recently demonstrated the effectiveness of jets and similar devices during a national meeting of the Smoke Prevention Association of America, Inc., held in Columbus in October.

As one observer reported, "Clouds


WHEN THE PROBLEM IS *Crushing*



INSTALL
MARION
DOUBLE ROLL
HEAVY DUTY COAL CRUSHERS

● Increase the market value of your coal by preparing it in demanded sizes with *Marion Coal Crushers.* Rolls adjustable for different size products. Least expensive to own and operate, they give quick return of purchase price and up profits. Sheet steel enclosures for clean, safe operation. Capacities from 22 to 400 TPH. Fly Wheel Pulleys are standard equipment, but gears can be furnished for direct connection where space for belt drive is lacking. Special drives to suit conditions. Just lay your problem in our engineers' laps!

***Your Coal is no Better than Your Crushing Equipment!***

*Marion Coal Crushers* have been in use in various designs for over 30 years. Constantly improved, they pay dividends in low-cost, efficient production in thousands of mines. Have this sturdy, trouble-free equipment!

*Write for Specifications and Prices Today!*

THE MARION LINE
MARION MACHINE, FOUNDRY & SUPPLY CO.
MARION, INDIANA, U.S.A.

| Railroad | Number of Locomotives Equipped with Jets |
|---|---|
| The Akron, Canton & Youngstown Railroad Co. | 1 |
| Atlantic Coast Line Railroad Co. | 6 |
| The Baltimore & Ohio Railroad Co. | 72 |
| Canadian National Railways | 6 |
| The Central Railroad Company of New Jersey | 1 |
| The Chesapeake and Ohio Railway Co. | 4 |
| Chicago, Milwaukee, St. Paul and Pacific Railroad | 2 |
| Cincinnati Union Terminal | 1 |
| Denver & Rio Grande Western Railroad | 3 |
| Illinois Central System | 5 |
| Interstate Railroad | 1 |
| Island Creek Fuel & Transportation Co. | 1 |
| Louisville & Nashville Railroad Co. | 130 |
| The Nashville, Chattanooga & St. Louis Railway | 29 |
| New York Central System | 1 |
| Norfolk and Western Railway | 178 |
| The Pennsylvania Railroad Co. | 129 |
| Richmond, Fredericksburg and Potomac Railroad Co. | 37 |
| Seaboard Air Line Railway | 4 |
| Southern Railway System | 25 |
| Tennessee Central Railway Co. | 3 |
| The Virginian Railway Co. | 24 |
| Western Maryland Railway Co. | 3 |
| The Wheeling and Lake Erie Railway Co. | 2 |
| Total | 666 |

of tarry, black smoke poured from the stacks of five locomotives standing on Track 5 at Union Station, obscuring the leeward yard and adding another black coat to the buildings and equipment. Then—with the turn of a wrist—the smoke was gone and only a light tan haze appeared above the engines."

The "turn of a wrist" had turned on the steam-air jets. Bituminous Coal Research, Inc., sponsored the demonstration and E. R. Kaiser, its assistant director of research, described the jets. He gave credit to R. B. Engdahl, a Battelle research engineer, and Eugene D. Benton, fuel engineer, Louisville and Nashville Railroad Company, for development and increased use of the jets, which are steam nozzles that propel extra air

"POTATOES"

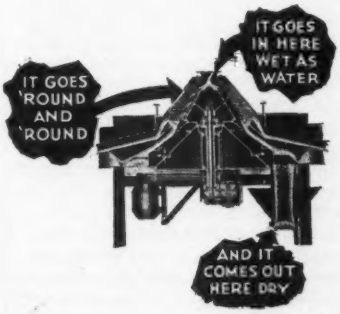

The "C-M-I" CONTINUOUS CENTRIFUGAL

Dewaters granular materials such as the finer coal sizes at a lower cost per ton than any other known method or machine.

And, the dewatered product is in such a physical condition that freezing, clogging of spouts, bins and cars is almost prohibited.

With the liquid being forced through a fine screen by means of the centrifugal forces, the "C-M-I" may be so arranged that considerable amount of the semi-colloidal fines are discharged with the liquid, or arranged so that most of these fines may be recovered.

Our engineering staff will appreciate having the opportunity of going into the details of your drying problems.




*Centrifugal and Mechanical Industries*
INC.
3600 South Second Street
St. Louis 18, Mo.

over the firebed as fresh coal is added. He said that railroads build and install the "smoke eaters" in their own shops from BCR drawings and specifications.

"We visualize that railroad smoke will be a thing of the past in only a few years," Kaiser added, "through the application of this device."

A recent survey made by BCR has developed the information that jets have been installed on 666 road and switch engines by the railroads listed in the accompanying table on page 67.

## M. A. Hanna and Bessemer Coal Merger

Shareholders of The M. A. Hanna Company at a special meeting December 18 approved the merger of Bessemer Coal and Coke Corporation into The M. A. Hanna Company. Of a total of 971,764 common shares entitled to vote, 889,704 shares were voted in favor of the merger and 125 shares were voted against.

It is reported that the merger became effective December 20.

## Aluminum Plants to Reynolds

The Reconstruction Finance Corporation has notified the Reynolds Metals Company that it has approved the company's offer to lease the government-owned Hurricane Creek, Ark., alumina plant and the Jones Mill, Ark., aluminum reduction plant.

The RFC board of directors approved the leasing of those two plants to Reynolds Metals Company subject to the approval of Stuart W. Symington, surplus property administrator, and the Department of Justice, and with the proviso that the royalties which will be required by the Aluminum Company of America on certain alumina facilities be satisfactory to the RFC.

Reynolds, under the terms of its approved offer, will lease the two plants for five years on a rental basis with a minimum payment to the government during the period in excess of $6,000,000, and a maximum payment for the same period of approximately $12,000,000 with an option to purchase at the expiration of this lease period. In addition, Reynolds will pay all real estate taxes and insurance costs, furnish the needed working capital and assume all losses, if any, from the operations. The leasee has agreed to sell alumina produced at Hurricane Creek, above its own needs, to others at cost plus six per cent. No government subsidy of any kind is involved.

Hurricane Creek is the largest and most modern alumina plant in the world with an annual capacity of 1,555,000,000 pounds. Jones Mill, 20 miles away, has a rated annual capacity of 144,000,000 pounds of aluminum pig. However, it has a power plant only capable of producing half enough electricity required for full operation. Consequently, Reynolds plans an annual production of 72,000,000 pounds of aluminum ingot at this plant.

Leasing of the two Arkansas plants to Reynolds marks the first step by the government agencies involved—the R. F. C. and the Surplus Property Administration—in their protracted efforts to turn over the now closed basic aluminum plants to private enterprise. Reynolds has also manifested interest in acquiring other government-owned aluminum plants, among them being the plants at Troutdale, Oreg., and Spokane, Wash. The addition of Jones Mill's 72,000,000 pound annual capacity to its own reduction plants at Listerhill, and Longview, Wash., which have a 165,000,000 pound annual capacity, give this independent company a total annual capacity three-fourths that of the entire American aluminum prewar production.


SEALTITE TAMPING BAGS

LESS POWDER NEEDED—
The Modern Way!

Good tamping—better sealing—is a practice that pays in many ways. It gives better shot-control and less explosive can be used resulting in fewer blown-out shots. Smoke and fumes are reduced to a minimum. "Less Powder Needed—The Modern Way" means the use of Tamping Bags for tamping. It means keeping plenty of bags—SEALTITE BAGS—at the face, filled and ready for use, to encourage good tamping.

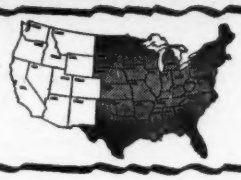
It's important that the tamping bags are uniform and as near the bore hole size as possible as bags of the right diameter tamp better. All SEALTITE BAGS are made uniformly and exacting in size.

Make your own tests. We'll send samples to you—FREE. Write us today just giving the bore hole size you use.

TAMPING BAG COMPANY

MT. VERNON, ILL.

# Western States



## Champion Mines Starts New Work

COLO.

Champion Mines Co., of Denver, has a crew of men rehabilitating the surface workings and preparing to install machinery at the Flying Cloud shaft on Bull Hill at Cripple Creek. This shaft, with contiguous territory, has been leased from the Golden Cycle Corporation and Champion proposes to drive from it along the Flying Cloud vein to and across the company's Morning Star property.

This drive will be about 400 ft. from the present Flying Cloud workings to the Morning Star line and about an equal distance across the latter property. In the course of the drive the company's engineer, E. A. Ritter, points out that one and possibly two intersections should be encountered.

Arrangements have been made for a gasoline driven Gardner Denver air compressor and a gasoline driven hoist to be delivered at the Flying Cloud shaft. President Jesse Simmons, of Champion Mines Co., states the machinery should be operating and headway made in the drive very soon.

## Mollie Kathleen Mines Ship Dollar Per Pound Ore

Two small lots of ore, weighing only 1,565 pounds, recently brought a return of $1,717 from the Ward and Rader lease on the Mollie Kathleen property on Tenderfoot Hill at Cripple Creek. This high grade was sacked and shipped by trucks to the mill in Colorado Springs. It is reported that the first lot, consisting of only nine sacks, settled at 125.20 oz. of gold. The weight of the sacks was 440 lbs. The second lot was settled at 42.60 oz., with 17 sacks in the lot weighing 1,121 lbs.

The lease is located on the lower levels of the mine, extends upward approximately 300 ft., with unusually rich values being recovered since the property reopened. The regular shipments have been settling at around 5 oz. Fred Ward and Bill Rader are the lease operators, working on a split check basis.

## Utze Company Active

The Utze Lode Mining Co. is preparing for production from the Madonna mine in the Monarch district west of Salida in Chaffee County, Colo., which is acquired from the Eilers interests of New York last April. The purchase included about 25 claims in addition to the Madonna group. The 300-ft. shaft will be rehabilitated and plans call for sinking it an additional 350 ft. Buildings are under construction and equipment is being installed at the portal of the No. 6 level tunnel. Principal values are reported in lead with some silver and gold.

W. K. Howard, of Colorado Springs, is treasurer and general manager of the Utze Lode Mining Co. and is in charge of the work. The company also holds the Tolland County lead-zinc claims in the Cascade district of Clear Creek County near Idaho Springs and other mining properties in Colorado. They also operate the famous Mendota Frostberg mine and mill at Silver Plume, a large producer of lead and zinc.

## Newmont Develops Park City Property

UTAH

The Newmont Mining Company has entered an agreement with the East Utah Company for development of its property which is situated in the eastern end of the Park City mining region.

Some development work has been performed on the East Utah which is still in the prospective stage, but no commercial ore has been developed. East Utah adjoins the Park Utah and the New Park property, both substantial producers of silver-lead-zinc ores.

It is also reported that the Newmont company is considering a development campaign at the Apex Standard mining property in the Tintic district.

## Beaver County Mines Show Big Output

UTAH

The mining industry, centered around Milford, Utah, in the two years of accelerated wartime production, produced $1,000,000 worth of critical metals and minerals.

Topping the list is 5,500,000 lbs. of zinc valued at $453,000. Next, 3,000,000 lbs. of lead with valuation of $195,000; followed by copper, 1,000,000 lbs. valued at $120,000; silver, 150,000 oz., $106,500; fluorspar, 2,500 tons, $62,000; tungsten, 50,000 lbs., $60,000; gold, 100 oz., $3,500.

Paid out for wages, freight, equipment and other supplies, etc., was the sum of $650,000. Seven producing mines are operating now, with five more slated to go into production soon. Ninety Milford men are employed in the mines and receive aggregate monthly wages of $30,000. More than 175 tons of ore are shipped daily.

The Horn Silver, largest and oldest of the producers, leased by the Metal Producers Co., is being operated on lease by J. H. Wren, general superintendent; J. W. McAffee, mine super-


## —Positions Available—

Well known company has several sales positions open for men to cover the mining fields in the United States, Canada and Mexico. Ex-service men with mining experience preferred. Can use physically handicapped veterans.

Send complete information about yourself, together with reference and salary expected.

Box 100—MINING CONGRESS JOURNAL
WASHINGTON 4, D. C.



## CHEAP HAULAGE

*Scraper Stockpiling Ore*

DUE to their long reach, Sauerman Power Scrapers have an advantage over other types of material-handling equipment for many jobs.

With one of these machines you can haul material from the top of a hill or from a pond, river or deep pit to a loading hopper, or build a big stockpile and reclaim from the pile with the same machine.

Capacities range from 10 to 600 cu. yd. per hour. Each machine, large or small, offers the greatest possible economy of power and labor in the performance of its specified job.

*Catalog on request.*

**SAUERMAN BROS., Inc.**
540 S. Clinton St., CHICAGO 7

intendent; and Wm. Hendrickson, engineer and chemist.

The O K mine, owned by Theodore Kronholm, is under lease to Jesse R. Villars. This mine has been an important copper producer.

The Harrington Hickory, operated under lease and option by James D. Williams, is owned by the New Majestic Mining Co. Anton Avaline is mine foreman. This is the only mine in the Milford area operating below the water level.

The Moscow, another famous old mine, is being operated by Robert H. Allsop, who has assigned his lease to the Manassa Mining & Milling Co. with Theo E. Stevens, as president.

The Old Hickory, five miles north of town, owned by the Prosper Mining Co., is under lease to F. S. Leany, surface operations, and George Howe, underground.

The Gold Reef Mining Co. is developing properties 20 miles northwest of Milford in the old Frisco district. Geo. Dunn is manager.

The Wah Wah, oxide lead-zinc producer, is under lease to M. D. Greehalgh. Shipping from this mine is through Lund, Utah.

## Continue San Manuel Development

ARIZ.

In a recent report to stockholders Magma Copper Company stated that in accordance with the terms of its contract with the vendors it has caused to be formed the San Manuel Copper Corporation to continue development of this property. Magma now owns or holds options to purchase all of the authorized capital stock of the new corporation except such shares as the vendors have received or may be entitled to receive under the terms of the agreement.

Drilling has continued as rapidly as suitable drill rigs became available. In addition to the 17 holes drilled by the Bureau of Mines, Magma has deepened six holes started by the Bureau and has completed 14 more with six others incomplete at this time. This drilling has considerably extended the mineralized area. Much additional drilling is necessary to delimit the mineralized area as well as to complete the drilling in the area now explored by too widely spaced holes. While sufficient data is not now available to permit an accurate calculation of tonnage or grade of the deposit, a large tonnage of mineralized rock is indicated, which seems likely to average somewhere between .7 per cent and 1.0 per cent copper. Recent drilling has shown in general about the same character of material as described in the last annual report, with the exception that the percentage of sulphides has considerably increased as compared with the earlier drilling.

## New Mizpah Mill

NEV.

It is reported that directors of the Tonopah Mining Company of Nevada are completing plans for construction of a 100-ton cyanide mill at the main Mizpah mine of the company. The estimated cost is $150,000. The Tonopah Mining Company is the oldest operating company in the Tonopah district, having operated the original claims discovered by Jim Butler. Total ore production of the Mizpah mine of the company is placed between $50,000,000 and $60,000,000; dividends paid exceed $17,000,000.

The bulk of the ore will come from the Mizpah mine, but custom ore will also be treated. Ores amenable to cyanide treatment sample around $10 a ton, and can be handled at a profit, the manager of the property, H. A. Johnson, says. It is expected to handle much custom ore from other nearby camps, including Goldfield and Divide.

* * *

A small scale mining boom is reported from Searchlight, in the southern part of Nevada, several old gold producing properties resuming work. This includes the Golden Dawn mine operated by Homer C. Mills, and the M. & M. and Blossom mines, also owned by Mills and associates.

* * *

An increase in prospecting activities in Churchill County, Nevada, is noted since the Army and Navy released control of bombing ranges in that area. Public lands in this area had been withdrawn during the war in order to provide bombing ranges and it was not only prohibited but extremely dangerous for prospectors to roam the area.

* * *

The Newmont Mining Corporation is understood to have taken an option on the Aladdin mines at Bullion in Elko County, Nevada. Bullion has a production record of $4,000,000 between 1869 and 1884.

* * *

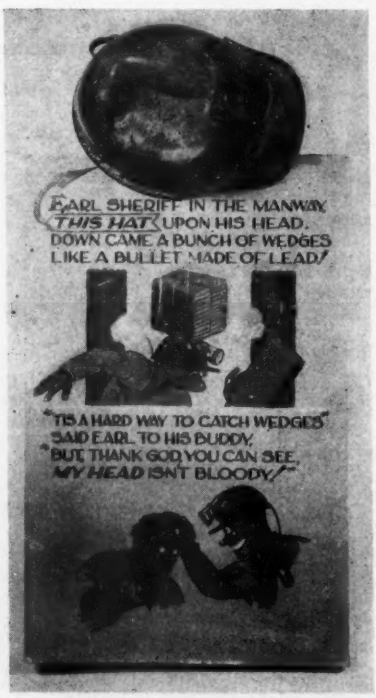
Miners in Utah districts have voted in favor of calling a general strike. Higher wages and other concessions are sought. Unions in this area are seeking the same wages as are paid under the Coeur d'Alene scale.

* * *

Directors of the New Park Mining Company have declared a 3-cent dividend, payable December 22.

* * *

Lessors operating in the Eureka Lilly property in the Tintic district have developed good showings of silver-lead-zinc ore, it is reported. The presence of mineralization has also been proved in drilling operations in other parts of the mine.


EARL SHERIFF IN THE MANWAY
THIS HAT UPON HIS HEAD.
DOWN CAME A BUNCH OF WEDGES
LIKE A BULLET MADE OF LEAD!
"TIS A HARD WAY TO CATCH WEDGES"
SAID EARL TO HIS BUDDY,
"BUT THANK GOD YOU CAN SEE,
MY HEAD ISN'T BLOODY!"

## High Grade Ore in "Rambo" Area

IDAHO

Officials of the Silver Syndicate Mining company report that the body of high grade lead-silver ore recently opened in the "Rambo" area of Silver Syndicate ground through Sunshine Mining company workings has now been drifted on for something over 200 feet, averaging from a minimum width of 3½ ft. to a maximum width of 12ft., all of which is exceptionally high grade ore, averaging a mine-run muck of about 28 ozs. of silver and 22 per cent lead. As the drifting advances east from the discovery, the silver values have increased from a ratio of 1 oz. of silver to each per cent of lead to 4 ozs. of silver to each per cent of lead. The hand sorted ore will average better than 60 per cent lead and 100 ozs. in silver. Mining engineers concede this to be the richest body of strictly silver-lead ore that has been found in the Coeur d'Alene district since the discovery of the Hercules mine in Burke in 1901. The Silver Syndicate ore is at a depth of 3,700 ft., or 1,000 ft. below sea level, the deepest operation in the Coeur d'Alene district.

## Sunset Works Complex Ores

The Sunset Minerals Company in the Pine Creek District southwest of Kellogg, is successfully mining and milling a body of low grade complex zinc-lead ore that has heretofore defied other operators who have attempted it. The production is from a blind vein on the 1,000-ft. level. According to Arthur Lakes, consulting engineer and geologist, 10,350 tons of the ore, produced from January to September, 1945, indicate average values per ton of 8 per cent zinc, 4 per cent lead and 0.7 ozs. of silver per ton, with some copper and gold.

"On the basis of present metal prices, plus premiums," he says, "by mining and milling 100 tons it is indicated the ore will return $4.75 per ton from lead concentrates and $7.90 per ton from zinc concentrates, a total of $12.65 per ton of mined ore. Costs, inclusive of $2.45 per ton development charge, total $8.40 per ton, leaving a net operating profit of $4.25 per ton, which should provide about $117,000 per year. The vein is big enough to stand production of 200 tons daily after its horizontal and vertical extent has been more extensively proven." D. A. Stewart is engineer in charge of the operation and O. Bardahl, of Seattle, is president of the company. Forty-six men are employed at the mine.

## Cadmium Recovery at Bunker Hill

Bunker Hill & Sullivan Mining & Concentrating Company has declared its fourth quarterly dividend for the year 1945. This time the payment to stockholders is 25 cents per share, or $327,000, as against 12½c per share, or $163,500 for each of the three preceding quarters. Reason for the increased payment is not stated, but it is believed to include the usual Christmas dividend paid by the company. This brings Bunker Hill dividend payments this year to $817,500 as against $654,000 in 1944, and the total dividend disbursements to $59,895,241. The company is known to have larger and better ore reserves in both lead-silver and zinc ores than ever before in its history and is now sinking to attain great depth. This company has made its large dividend record from comparatively shallow workings, but the lowest levels in the mine show large and extensive ore bodies that promise permanence at greater depth. During the past few years the company has added several millions of dollars in improvements to the Bunker Hill smelter by addition of units to recover losses formerly made in the smelting operation. Latest unit to be added to the plant is a process to recover cadmium metal from the lead smelter fumes. The process finally adopted is the result of five years experiment with every known process in use in the United States, a combination of which has been worked out by Harold E. Lee, research chemist and metallurgist for Bunker Hill, to fit the conditions existing at the smelter.

"Three types of cadmium recovery are practiced in the United States," explained Mr. Lee. "The Sullivan Company, at its cadmium plant, which has been in operation with the Sullivan zinc plant, near Kellogg, since about 1930, employs the processing of electrolytic zinc purification residue with a direct acid leach, followed by precipitation, resolution and electrolysis. Another method is by processing retort zinc purification fumes, as exemplified by the American Zinc Company at East St. Louis." The Bunker Hill, however, was faced with the problem of recovering cadmium from its lead smelter fumes. General lead smelter cadmium recovery practice is not only undesirable but also uneconomical at Kellogg, Lee said.


**Super Duty DIAGONAL DECK CONCENTRATING TABLES**

***Have 75% More Effective Riffles***

***You Profit From***

**HIGHEST RECOVERY—RICHER CONCENTRATES**

Although the principle of rhomboidal deck construction was developed almost 40 years ago by The Deister Concentrator Company, it is still the most significant advancement since tables were invented.

Therefore, today the *Diagonal* Deck utilizes full advantage of the natural obliquity of pulp flow over a table. As a result the pulp is processed over approximately *75% more effective working riffles* than can be workably provided on any rectangular table.

Consequently, a substantially greater table load of pulp is handled effectively, and at the same time a much more efficient separation is made.

These facts are proved by the many years during which *Concenco's Diagonal Deck Tables* have given outstanding results and become the standard equipment at leading ore dressing installations. It is worth your time to investigate these efficient, profit-making tables. Send today for Bulletin 118-A and full details.

★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

"The operation and products are messy, considerable manual labor is involved and excessive acid consumption is required. In view of the high freight charges into Kellogg the acid cost alone would be practically prohibitive.

"Economical cadmium recovery operation at the Bunker Hill smelter was dependent upon an improved method of converting the cadmium content of our bag-house product into a readily soluble form and the attainment of higher cadmium concentrations. Both of these initial objectives were gained in the development of reverberatory concentration procedure in 1933-34."

## Afterthought Mine Begins Development

Coronado Copper & Zinc Company of Los Angeles has commenced an extensive development program at the old Afterthought zinc-copper mine at Ingot, near Redding, Shasta County, California. The company recently took the property under auction from the Glidden Company.

The mine is opened by one tunnel and two shafts which go to a depth of 400 ft. The owners have maintained the workings in good condition and actual development work is expected to be under way shortly even though the mine has been idle since 1928.

The mine was opened originally in the 1880's and a smelter was later operated at Ingot with the usual difficulties of those days in recovering the zinc, which under the smelting methods then in vogue constituted a liability. Present day improvements in selective flotation of course tell a different story. The Glidden Company took over the Afterthought in 1924 and commenced operations in December, 1925. Ore from the Afterthought and the Rising Star properties was shipped over an 8½-mile aerial tram to the 300-ton flotation plant at Bully Hill. Concentrates were shipped by rail to Oakland and from there to Antwerp, Belgium. It is reported that loss of the zinc contract with the Antwerp smelters resulted in closing down of the properties in August, 1927.

Coronado Copper & Zinc is controlled by Harvey S. Mudd of Los Angeles and operations at the Afterthought mine are in charge of Lyttleton Price, engineer. This company also operates the Republic mine at Dragoon, Ariz. Edward L. Ralston of Oakland, Calif., general manager of Chemical & Pigment Company, Division 33 of Glidden Company, is manager of Glidden's mining interests.

## Golden Feather to Have New Dredge

The Golden Feather Dredging Company, of which E. A. Wiltsee is general manager, is reported to be planning the installation of a second dragline dredge to be in operation by January 1, on gold placers at Mormon Bar on Middle Fork of American River. This is six miles east of Auburn, Calif. Dredge No. 1, which formerly operated on banks of the Feather River at Oroville, Butte County, Calif. (MINING CONGRESS JOURNAL, August, 1944, p. 21) was recently installed on Mormon Bar gravels and is now in full operation. S. J. Norris, Jr., is in charge.

Golden Feather has done considerable sampling of the placers which it controls and this testing has indicated sufficient gravel for several years' steady production by two dredges. One claim in the group is reported to contain virgin gravel running high in gold values. Adjacent placers worked in the early days are said to have been some of the richest deposits ever mined in California. Dredge No. 1 has a capacity of 7,000 cu. yds. per day.

## Annual Convention, Northwest Mining Association

The 51st Annual Convention of the Northwest Mining Association took place in Spokane, December 7-8. A very good and well-attended meeting was reported with Senator McCarran as principal attraction for the annual banquet.

Wray Farmin, a director of the Day Mining Enterprises, was elected president, succeeding Charles E. Marr who concluded two terms in office. Leo J. Hoban, secretary of the Hecla Mining Company was named vice president and Mrs. Margaret Orr was reelected assistant secretary. A secretary will be named later.

The Friday morning session began at 10 o'clock with Charles E. Marr as chairman conducting an open panel discussion with Harry Marsh, secretary, Idaho Mines Association; Carl Trauerman, secretary, Montana Mining Association; George H. Waterman, West Coast Minerals Association; and Frank Lilly, Washington Prospectors Association. A. E. Jukes, president, British Columbia Chamber of Mines, also contributed to the discussion. Evan Oscarson and Wellman Clark reported on "Federal, State, and County Mineral Land Policies."

Dr. Francis Thomson, president, Montana School of Mines, presided at the luncheon where the speakers were the Hon. Walter Horan, U. S. Representative, and Dr. Philip Shenon, former head of the Northwest Division of the U. S. Geological Survey, speaking on "Minerals at War."

Howard Washburn and Russell Caples were chairmen of the afternoon session at which Dean A. W. Fehrenwald of the Idaho School of Mines spoke on "Engineers—Is There a Need?" H. J. Hull, attorney, Wallace, Idaho, spoke on "Collective Bargaining Negotiations and Contracts." "Mining in Ferry County, Washington" was described by Everett Hougland and S. H. Lorain, U. S. Bureau of Mines, Albany, Oreg., also discussed local problems.

Elmer Johnston, Spokane attorney, was chairman on the open panel session covering S.E.C. activities under the title "Problems of Financing."

C. A. R. Lambly and J. B. Haffner were chairmen of the Saturday morning session at which Frank Woodside, British Columbia and Hukon Chamber of Mines, discussed "Progress of Mining in Western Canada." Dean Milnor Roberts of the School of Mines, University of Washington, spoke on "Opportunities Ahead" and Anton Money on "Gold in British Columbia and Along the Alcan Highway." Sheldon Glover, of the Division of Mines and Geology, State of Washington, reported on the activities in his department and W. A. Richelsen, Kennecott Copper Mining Company, spoke on "Opportunities for Prospecting and Development."

The luncheon meeting was under the chairmanship of Charles E. Marr. At this meeting the new president was introduced and Earl Braden, president, Spokane Chamber of Commerce, spoke, as did also Rep. Walter Horan.

In the afternoon J. J. Curzon of the Howe Sound Mining Company and P. C. Feddersen, Bunker Hill & Sullivan Mining Company, presented a program which featured Art Garton, director of the Department of Development and Conservation, and H. A. Doerner of the U. S. Bureau of Mines, Pullman, Wash., who described "Twelve Years of Research." Wallace G. Woolf, superintendent, Sullivan Electrolytic Plant, Kellogg, Idaho, described the "Outlook For Zinc." H. M. Bannerman of the Economic Division of the U. S. Geological Survey, was also presented and there was an open panel discussion on taxes in which T. R. Toole, C.P.A. of Spokane, P. Jessup, attorney of Wallace, and L. Randall, C.P.A., of Wallace, all took part.

*1946 Resolution*

**That every American Buy and Hold U. S. SAVINGS BONDS**

## Top Cutters

(*Continued from page* 25)

The above does not include increased productivity that would be attained by also decreasing the delay items as such, shown in the delay time category. Neither does it consider the possible savings in reduction of portal travel time in and out which now amounts to 15.7 per cent of the day's total available time of 9 hours or 540 minutes. In this analysis we are concerned only with the analytical effect top cutting would have on the productivity of the conveyor loaders used at this mine. Similar comparative analysis can be shown for mobile loaders used in either track or trackless mining systems.

I want to again express my appreciation for this opportunity to be among you and discuss with you the many ramifications of mechanical loading of coal—the one factor today that will exert more good and benefical influence to the future cause of industry than any other one you can name.

## Oregon Coal

(*Continued from page* 35)

poor condition of the coal offered for sale, and partly to the abundance and cheapness of local wood fuels. The picture is changed now, however, with carefully washed and screened coal available for the first time, and with most wood fuels either scarce or unobtainable. Local wood fuels are by-products of the sawmills on the bay, which at present are shut down by labor-management difficulties. In addition to this immediate shortage, there is a gradual reduction of lumber sawed locally as forests are cut back. In the future, wood fuels will rise in cost as delivery distances increase, while coal costs should remain stabilized.

The wage scale at the mine is $8.00 a day for trucker's helper, $9.00 for coal pickers, spraggers, and hoist men, $10.00 for truckers and muckers, and $11.00 for machine men and bunker foremen. The mine is not unionized. The Coast Fuel Corporation is headed by T. O. Toon, president. M. W. Bennett is general manager at the mine, with W. A. Wilson, consulting mining engineer, and Frank Churchich, mine foreman. Forty-five men are employed at the present time, but this number will be reduced to 36 when some extra surface work is completed and both underground shifts are brought up to full strength.

### Future Plans

Future plans for the mine include driving to the property line, turning rooms and robbing pillars while retreating. Once the present entries are completed, the slope will be deepened another 300 ft. and a new set of entries started. A separate block of coal lying up the dip from the present operation and above the abandoned workings of the original mine is to be opened up by the No. 2 mine as soon as labor and materials permit. Coal from this operation will be delivered to the washery by a surface tram or some similar system.

## Springston Dam Solidly Opposed

Army engineers estimate the proposed dam across the Coeur d'Alene River at Springston, Idaho, would cost $36,000,000. About $18,000,000 of this sum would be for dam construction, $5,000,000 for rebuilding destroyed sections of the Union Pacific railroad between Wallace and Spokane and $13,000,000 for the purchase of flooded agricultural and timber land and the rebuilding of the No. 10 National automobile highway. The crest of the dam would be at an elevation of 2,700 ft., or 30 feet above the present valley floor. The artificial lake created by the dam would be 28 miles long, would contain 2,826,000 acre ft. of water and would cover 28,934 acres of land, of which 3,235 acres are now cultivated, 766 acres is residential tracts, 16,511 acres waste or unimproved land and 8,422 acres timber land.

The public relations department of the Army engineers says in an official report on the project: "A number of wells and other mining property near the upper end of the reservoir would be affected by the reservoir storage, but not seriously, and the government would reimburse all property owners for all damages during construction and after."

Some of the "wells" in this section are mine workings several thousand feet deep and damages resulting might possibly amount to more millions than the cost of the dam. All the mining companies in the Coeur d'Alene district are solidly against construction of this dam, for the reason that the impounded water would cover several miles of the Osburn fault, which runs the full length of the mining district, and result in flooding the deep levels of all the mines to a point beyond pumping capacity.

## BOOK REVIEWS

ENGINEERING PREVIEW. *Home Study Edition. By L. E. Grinter, Harry N. Holmes, H. C. Spencer, Rufus Oldenburger, Charles Harris, R. C. Kloeffler, V. M. Faires. The MacMillan Company, New York.* 619 *pages.* $6.00.

THIS interesting introduction to engineering contains the background of mathematics, chemistry and allied sciences with which the future student of engineering must be familiar. Technical advice usually available only through a study of several books is gathered together with advice on what and how to study it.

Each succeeding chapter presents specific facts on subjects and is written by a man particularly qualified in that field. The book is designed as an all-around aid to a person wishing a thorough background in which to continue work in whatever branch of engineering he may choose.

HOW TO HANDLE COLLECTIVE BARGAINING NEGOTIATIONS.

A SPECIALLY prepared report on this vital subject, is based on an exhaustive survey which was conducted by the National Foremen's Institute, Inc. The material was carefully checked by a panel of distinguished labor relations experts and the final draft edited by the staff of the *Executive's Labor Letter.*

Clearly, and in no sugar-coated terms, it points out the errors and fallacies which have tripped management in the past and how to avoid those costly mistakes in the future.

It is a tough, militant report on the conduct of successful labor negotiations.

Multigraphed in two colors on rag paper, 9½ x 11½; bound in Multo binder, 42 sheets, $5.00 f. o. b. shipping point. National Foremen's Institute, Inc., Deep River, Conn.

BALL AND ROLLER BEARING ENGINEERING. 270 *pp.*, 900 *drawings and tables. "Ball and Roller Bearing Engineering" has been published by SKF to serve as a fundamental text on all phases of bearing applications to industry.*

BEGINS with a technical description of common bearing types and continues through nine chapters of fundamental engineering studies. First copies of the book will be sent by SKF to the heads of leading corporations, technical schools and colleges and libraries in principal U. S. cities. Later editions will be sold at cost by the Company to students and others interesting in bearing studies.

# MANUFACTURERS FORUM

## New Construction in Flexible Tubing

A new type of flexible tubing, non-collapsible under plus or minus pressures and retractable to about one-

eighth its extended length, is announced by the Warner Brothers Company, spiratube division, Bridgeport, Conn., for portable or semi-permanent ventilation or any handling of air, gases or light solids. Its spring steel helix core causes it to spring out, like a jack-in-the-box, to its fully extended length, and it will stay in this position regardless of whether it is working on pressure or suction.

## New M.S.A. Protective Mask Generates Its Own Oxygen

Just announced by Mine Safety Appliances Company, Braddock Thomas & Meade Streets, Pittsburgh 8, Pa., is a radically new development in respiratory protection, the M.S.A. Chemox oxygen breathing apparatus. This apparatus, employing a replaceable chemical canister, generates its own oxygen and gives the wearer one hour's protection in unbreathable air. Weighing but 13½ lbs., complete, and with no cylinders, high-pressure valves or fittings, the new Chemox apparatus is ideally suited to the requirements of industry and fire departments in meeting any emergency where high concentrations of poisonous gas or oxygen deficiencies are encountered.

For the first time in the history of science, chemical combination in a simple canister creates oxygen—*by merely breathing into it.* Exhaled breath passes from the "All-Vision" facepiece through the exhalation tube and into the canister where carbon dioxide is removed. Evolved oxygen flows into the breathing bag reservoir, then to the facepiece through the inhalation tube.

The M.S.A. Chemox self-generating oxygen breathing apparatus is simple to use, and can be worn and operated without special training. It is quickly put on, and the replaceable canister does the whole job. Before the canister is exhausted, a pre-set alarm bell rings a warning to replace the canister with a fresh one. M.S.A. Chemox apparatus is now immediately available for civilian use. A descriptive bulletin, BM-8, is now available on request, fully illustrating the apparatus and giving complete details of its operation.

## Marion Develops the 151-M for Heavy Duty Digging

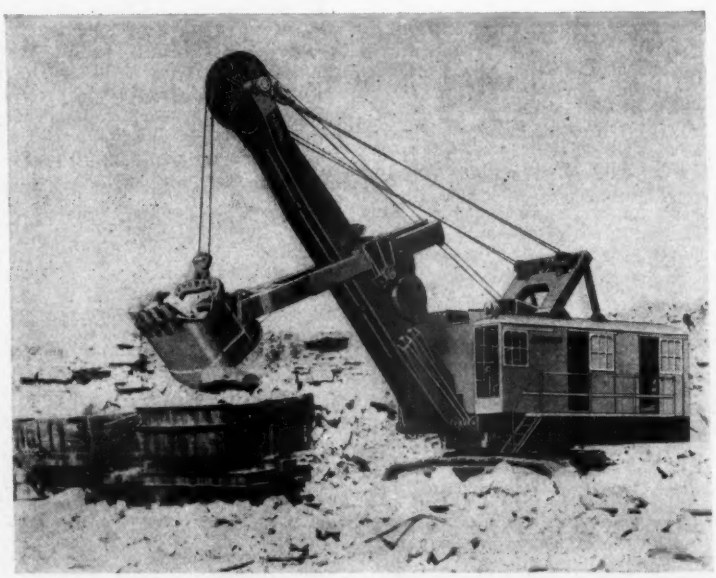
The first post-war addition to its line is announced by the Marion Steam Shovel Company, of Marion, Ohio. It is the Type 151-M, especially designed throughout to meet a demand for high production in heavy digging, particularly in rock and ore.

As a heavy duty, close-coupled shovel, it carries a 6 cu. yd. dipper with a standard front end or a 5 cu. yd. dipper with long range front end.

The 151-M is convertible to a dragline machine and dragline bucket sizes vary from 3½ to 7 cu. yd., depending on boom lengths which range from 80 to 120 ft.

Marion has incorporated in the 151-M the latest type of high speed electrical control—the "Amplidyne" or "Rototrol" Ward-Leonard system—on all motions, providing greater speed, more accurate and delicate control over all motions than was ever before possible. These result in an over-all gain in speed of operation and a corresponding increase in tonnage of material handled. They permit full capacity use of power and at the same time act as automatic regulators, protecting both the electrical and mechanical parts against undue stresses by guarding against excessive current and torque peaks.

Features of the 151-M making it particularly adaptable for heavy service jobs are: Outside dipper handles; single hitch to dipper; herringbone gear drive to hoist drum; two-piece heavy duty dipper.



## Benjamin S. Dowd Elected President of Vulcan Iron Works

At a special meeting of the board of directors of the Vulcan Iron Works held at Wilkes-Barre, Pa., on December 18, 1945, Benjamin S. Dowd was elected president and general manager.

In assuming the presidency of the Vulcan Iron Works Mr. Dowd retains directorships in a number of other well-known industrial organizations and brings with him a background of wide business experience that has already proved invaluable in solving reconversion problems and reorganizing for increased production. Promotions announced thus far by Mr. Dowd include the appointments of J. F. O'Brien as director of purchases, Geo. W. Walter as works manager, Jos. Lehnert as production manager and C. A. Netter in charge of planning.

Benjamin S. Dowd

## Grease for Ball and Roller Bearing Motors

For dependable lubrication from 13° F. to 176° F. for all speeds up to 3,600 r.p.m. and for horizontal or vertical operation, an improved grease for ball and roller bearing motors is announced by the Westinghouse Electric Corporation.

Available in a new 8-oz. nasal type tube, the grease is said to be stable, highly resistant to oxidation, and will remain in a bearing for an indefinite period without drying out, caking or separating. The new tube is designed for easy and economical use. It has a large opening in the long nasal spout which fits into a ⅛-in. pipe coupling, and a key with which to wind and exert pressure from the bottom of the tube.

Further information on the grease may be secured from Box 868, Westinghouse Electric Corporation, 306 Fourth Avenue, Pittsburgh 30, Pa.

## —*Announcements*—

**Roberts and Schaefer Company,** Chicago, have announced a new Pittsburgh office address. Under the direction of R. T. Middleton, vice president of the company, business will be conducted from 2221 Oliver Building as of December 1, 1945.

* * *

Robert T. Kain, who has been recently placed on inactive status by the U. S. Navy with the rank of lieutenant commander, has been appointed San Francisco district manager of the Industrial Products Sales Division of **The B. F. Goodrich Company,** it is announced by E. F. Tomlinson, division general manager.

* * *

**The Wickwire Spencer Steel Division,** Colorado Fuel and Iron Corporation, has announced the appointment of Herbert D. Rollo as New England District sales manager.

* * *

**Oliver United Filters, Inc.,** announces the appointment of Western Machinery Co., S. A., Mexico D. F., as its agents in Mexico and Central America, particularly in connection with sales of filters, pumps and accessories to the chemical and metallurgical industries.

J. L. Singleton has been appointed manager for the 60 district offices of the Allis-Chalmers general machinery division's sales department, according to William C. Johnson, vice president.

* * *

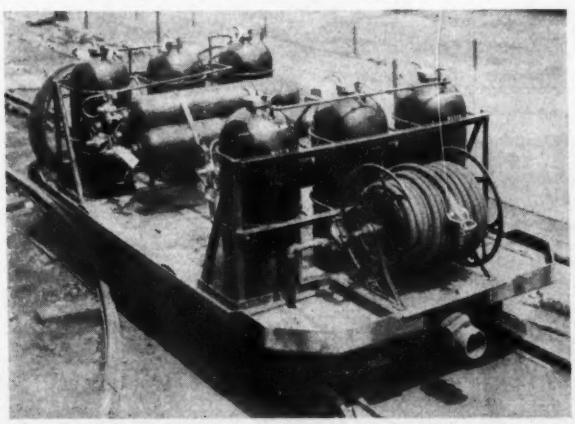
**Robins Conveyors, Inc.,** announces that A. P. De Vita, of East Paterson, N. J., has joined the equipment sales staff, where he will specialize in the company's Floatex Shakeout for the foundry industry.

* * *

**The International Nickel Company, Inc.,** announces the opening of the Cincinnati Technical Section of its Development and Research Division as of December 1, 1945. It will be located at 1715 Carew Tower, Cincinnati 2, Ohio.

Richard B. Kropf, metallurgist, has joined International Nickel and will be in charge of the new section which will furnish technical assistance to industry in the territory embraced by southwestern Ohio, the southern half of Indiana, and Kentucky.

## New Mine Fire-Fighting Car



First experimental model of new mine fire-fighting car, developed for use in coal mines by The Dugas Division of Ansul Chemical Company, Marinette, Wis., had its initial test when it made a 4-mile run into a mine and quickly extinguished a fire which had had a 35-minute headway

## CATALOGS AND BULLETINS

ARC-WELDING ELECTRODES. *Wilson Welder & Metals Co., Inc.,* 60 East 42nd St., New York 17, N. Y. 32-page illustrated catalog, designed to guide electrode users in the selection of the right electrodes for any specific job.

CONWAY SHOVEL. *Goodman Manufacturing Company,* Halsted St. at 48th Pl., Chicago, Ill. Bulletin CL-451, describes the Type 125 Conway Shovel, giving details of design and operating advantages of this loader, with complete illustrations showing typical operations.

LEVER-OPERATED GATE VALVES. *Everlasting Valve Company,* 49 Fisk St., Jersey City 5, N. J. A 16-page bulletin, E-150 shows industrial and process line applications for which these valves are particularly advantageous.

PLYLOCK BELT JOINTS. *The B. F. Goodrich Company,* Akron, Ohio. Company has just issued a new catalog section on its Plylock belt joint, giving illustrated step-by-step description of making rubber belts endless by the Plylock method.

POWER DUCKBILL. *Goodman Manufacturing Company,* Halsted St. at 48th Pl., Chicago, Ill. Bulletin CC-452, gives information on the duckbill method of loading, with diagrams showing typical cycle of duckbill operation at face.

**CORE DRILLING**

ANYWHERE

We look into the earth

PENNSYLVANIA

DRILLING COMPANY

PITTSBURGH, PA.

ROBINSON

VENTILATING COMPANY

**Fans and Blowers**

**Ventilating Engineering Service**

ZELIENOPLE

PENNSYLVANIA

*Established 1902*

HOFFMAN-BROS-DRILLING-CO.

*CONTRACTORS*

DIAMOND CORE DRILLING

PUNXSUTAWNEY, PA.

**Our specialty—Testing bituminous coal lands**
**Satisfactory cores guaranteed**

**UNIVERSAL SCREENS and UNIVIBE RIDDLES**

Vibrating Screens and Vibratory Riddles, in many sizes and types, all priced most reasonably. . . . Tried, Proved and Guaranteed Products. Leaders in Screening Field Since 1919.

*Write for Catalog on Screens and Screening*

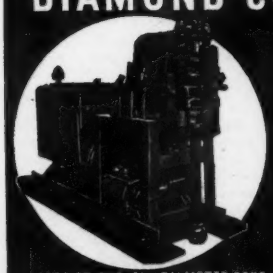
Two-Deck Model 42" x 96" Motor & V-rope Dr.

UNIVERSAL VIBRATING SCREEN CO.

RACINE - - WISCONSIN

**DIAMOND CORE DRILLING**

CONTRACTORS



TESTING COAL AND ALL MINERAL PROPERTIES - USING OUR LIGHT GASOLINE DRILLS.. THEY SAVE FUEL AND MOVING COSTS.. WE GUARANTEE SATISFACTORY AND PROPER CORES..

PRE-PRESSURE GROUTING FOR MINE SHAFTS... GROUND SOLIDIFICATION FOR WET MINE AREAS BY OUR STOP GROUT METHOD. WATER WELLS AND DISCHARGE HOLES DRILLED AND GROUTED... ELECTRIC DRILLS FOR INSIDE MINE DRILLING..

1200 FT. CAP. 2¼ DIAMETER CORE

**MOTT CORE DRILLING CO.**

HUNTINGTON, W. VA.


## INDEX TO ADVERTISERS


| | Page |
|---|---|
| American Brass Co., The | 60 |
| American Chain & Cable Co., Inc. American Cable Division. | 20 |
| American Car & Foundry Co. | Insert between 12-13 |
| Centrifugal & Mechanical Industries, Inc. | 67 |
| Cleveland Cliffs Iron Co., The | 19 |
| Cleveland Rock Drill Division The Cleveland Pneumatic Tool Co. | 8 |
| Climax Molybdenum Co. | Insert between 12-13 |
| Colcord, F. Carl | 64 |
| Cummins Engine Co., Inc. | 7 |
| Deister Concentrator Co., The | 71 |
| DuPont de Nemours Co., E. I., Inc. | 5 |
| Edison, Inc., Thos. A. Storage Battery Division. | 4 |
| Electric Storage Battery Co., The | 12 |
| Gardner-Denver Co. | 52 |
| Gould Storage Battery Corp. | 14 |
| Haney, Marshall | 64 |
| Hanna Coal Co. | 63 |
| Hoffman Bros. Drilling Co. | 76 |
| Industrial Safety Service | 64 |
| Ingersoll-Rand | 11 |
| I-T-E Circuit Breaker Co. | 63 |
| Jeffrey Manufacturing Co. | Insert between 8 and 9 |
| Joy Manufacturing Co. | 38-39 |
| Kennametal, Inc. | 6 |
| Loftus, Peter F. | 64 |
| Mack Trucks, Inc. | 56 |
| Macwhyte Company | 65 |
| Marion Machine Foundry & Supply Co. | 66 |
| Marion Steam Shovel Co., The | 2-3 |
| Mine Safety Appliances Co. | Back Cover |
| Mott Core Drilling Co. | 76 |
| Ohio Brass Co. | 9 |
| Paulick, P. R. | 64 |
| Pennsylvania Drilling Co. | 76 |
| Reconstruction Finance Corp. | 13 |
| Roberts & Schaefer Co. | Third Cover |
| Robinson Ventilating Co. | 76 |
| Sauerman Bros., Inc. | 69 |
| Sheffield Steel Corp. | 16 |
| Tamping Bag Co. | 68 |
| Timken Roller Bearing Co. | 10 |
| Union Pacific Railroad | 15 |
| United States Rubber Co. | Second Cover and 17 |
| Universal Vibrating Screen Co. | 76 |
| Wheel Trueing Tool Co. | 18 |
| Wilmot Engineering Co. | 62 |
| Young, L. E. | 64 |

# MAXIMUM COAL CLEANING . . .

## *per dollar invested*

Island Creek Coal Co., Holden, W. Va. prepares coal from five mines with Stump Air-Flow Cleaners. 15 units are in operation. A typical flow sheet at Mine No. 16 includes R & S Hydro-Separators for coarse coal washing and R & S Air-Flow equipment for fine coal dry cleaning.

**R & S Stump Air-Flow Cleaner, for dry cleaning of your coal when desirable, is low in first cost, low in maintenance and high in capacity. The Air-Flow Cleaner occupies a minimum of floor space and needs little attention, yet it cleans up to 100 tons of coal per hour, depending upon the size and cleaning characteristics of the coal and the width of box used.**

**For maximum coal cleaning per dollar invested get full information about the R & S Stump Air-Flow Cleaner—Bulletin No. 163.**

**Coarse coal can be prepared economically in the popular R & S Hydro-Separators. Ask for Bulletin No. 161.**

**The R & S Hydrotator for washing coal in finer sizes is another R & S engineering achievement. Described in Bulletin No. 162.**

R AND S COMPANY

## ROBERTS and SCHAEFER CO.

*307 North Michigan Avenue, Chicago*

2221 Oliver Building
PITTSBURGH, 21, PA.

P. O. Box 570
HUNTINGTON, W. VA.

# Edison

## ELECTRIC CAP LAMPS

## M.S.A. SKULLGARDS

• EQUALLY EFFECTIVE
• EQUALLY FAVORED

*In Coal and Metal Mining*

**Better illumination, durability and long life are outstanding Edison Electric Cap Lamp advantages, appreciated by men and management in mining everywhere. The dependable head protection, light weight and easy-fitting comfort of M.S.A. Skullgards and Comfo Caps serve coal and metal miners with equal benefit. Demonstrations gladly arranged.**

**MINE SAFETY APPLIANCES COMPANY**

BRADDOCK, THOMAS AND MEADE STREETS · PITTSBURGH 8, PA.

*District Representatives in Principal Cities*

*In Canada:* MINE SAFETY APPLIANCES COMPANY OF CANADA, LIMITED

TORONTO . . . MONTREAL . . . CALGARY . . . VANCOUVER . . . NEW GLASGOW, N. S.